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Original Contributions.

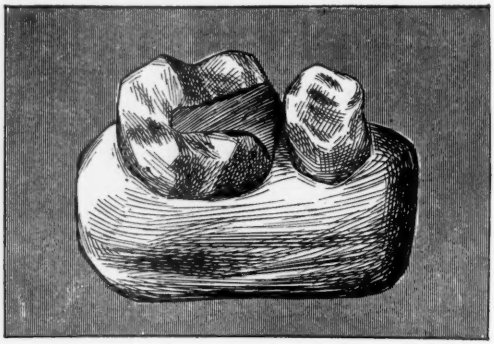
REASONS FOR THE FAILURE OF FILLINGS IN THE APPROXIMAL SURFACES OF BICUSPIDS AND MOLARS.

BY J. F. WALLACE, D. D. S., CANTON, MO. READ BEFORE THE MISSOURI STATE DENTAL ASSOCIATION, AT ST. LOUIS, MAY, 1905.

In considering the causes of failures of fillings in the proximal surfaces of bicuspids and molars I shall divide them into three classes—first, those having failed from some defect in the preparation of the cavity; second, those resulting from the failure to restore the tooth to its normal form, and third, those due to defects in making and finishing the filling—and under each of these I will take up separately such as appear to me to be responsible in some degree for the failure of operations made in the mouths of individuals whose susceptibility to redecay would indicate a greater service than that rendered by the operation. Among the various causes of failure in the preparation of cavities I doubt if there is any that is responsible for more failures in proximal surfaces of bicuspids and molars than the failure to make a flat gingival seat upon which the filling may rest. The necessity for this, it would seem, is so apparent that none would neglect it, but from observation I am constrained to believe that many fail to realize the necessity for it or are entirely indifferent as to the performing of the duty as they see it. When we remember that almost anyone is capable of exerting 150 pounds pressure upon the bicuspid and molar teeth, and that many individuals exert 250 pounds, and an occasional man is found who is capable of exercising a force in occlusion of 375 to 400 pounds, with this immense force to be withstood can we expect a filling to remain in perfect contact with cavity walls that has anything but a flat gingival seat to rest upon? How often have we placed a filling in the proximal surface of a bicuspid or molar, polished or

burnished (as most are likely to do) with the amalgam filling smooth with the cavity margins, and a few months later found it upon examination bulged from the cavity, leaving an open margin around the entire cavity capable of being seen by the naked eye, showing beyond doubt that the filling had left its original position in the cavity, causing an open margin wherein the bacteria might find lodgment and their labors of destruction would not be disturbed.

This condition is in nearly all cases due to the preparation of the cavity, and more particularly to the gingival seat, which in a

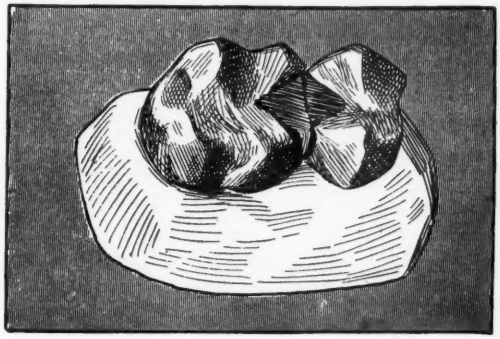


In Fig. 1 we have the illustration of a case where the filling was placed upon an oval gingival seat with the occlusal step anchorage of such reduced depth and width that when subjected to heavy stress of mastication the anchorage stretched and permitted the filling to move from the cavity walls, allowing the recurrence of decay.

large majority of cases is oval, both linguo-buccally and mesio-distally. If we hesitate for a moment's consideration we can scarcely expect anything else of a filling built in a cavity with a gingival seat of such shape. When we consider that a filling must resist a force so great (because the entire force which the jaw is capable of exerting is often brought to bear upon it), we are not justified in expecting it to resist the pressure except when built upon a flat gingival seat, both mesio-distally and linguo-buccally.

Another point of weakness in the preparation of cavities for this class of fillings is that of insufficient anchorage. Many, and I am not sure but the majority, of the fillings coming under my observa-

tion have depended entirely upon the lateral anchorage for retention of the operation, and almost universally, when depending upon same, you will find an oval gingival seat. The lingual and buccal walls are usually rather oval-formed, and this often constitutes the entire anchorage provided for the maintenance of the filling, but some men are sufficiently careful in securing their operation to cut the occlusal portion of the cavity into a dovetail form. It is quite true that we find fillings which have maintained their position and given service for a number of years with such cavity preparation, but if careful examination is made I assure you



In Fig. 2 we have a combination of causes of failure: First, insufficient separation to restore the normal contour, which resulted in a broad, flat contact, with the interproximal space practically obliterated, the lingual and buccal embrasures greatly restricted, the cavity margins extended only to sound dentin, which left them in contact with the adjacent tooth and entirely within the area of susceptibility to redecay, which resulted in a recurrence of decay and the loss of both fillings, together with a large area of tooth structure.

that in the large majority of cases you will find the individual manifesting but slight evidence of strong occlusion. However, if you make an examination of the mouth where the teeth are worn down, showing the effect of heavy force of occlusion, you will find but few fillings placed in this manner in this class of cavities in position with perfect cavity margins.

We are seldom if ever justified in placing a filling in the proximal surface of a bicuspid or molar, where the occluding tooth is in position and the occlusion is normal, without securing it by a step anchorage cut at a right angle to the pulpal wall in to the

occlusal fissure. If this is done, and the step is sufficiently broad and deep, making that portion slightly broader at the end farthest from the cavity, there will seldom be any movement of the filling in the cavity, but care must be exercised in preparing the step to make it sufficiently deep and broad to insure sufficient filling material to prevent stretching or breaking it in the force of occlusion in the work of mastication. The movement of the jaw being from the distal forward in the course of mastication, it is important that the anchorage of mesial fillings in the upper teeth and distal fillings in the lower be given greater security, making the step broader and deeper than we would were the cavities placed upon the opposite surface of the teeth.

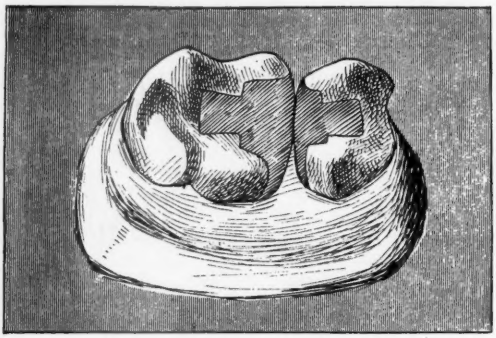


Fig. 3 represents Fig. 2 restored, giving the normal interproximal space, contact point and embrasures, showing the cavity margins extended to area of self-cleanliness and the fillings anchored by occlusal anchorage.

It has been advocated by some and practiced by many, as a means of anchorage of fillings in these cavities, to first line the cavity walls with a lining of thin cement, and while in a plastic state build the gold or amalgam upon it. Dr. Wedelstaedt in a series of experiments a number of years ago found that the cement was very unreliable for this purpose—not because of its inability to hold the filling, but because of its continual changing of form for days and weeks, many of the cements expanding very materially. You will readily see that it would be impossible to maintain the close contact between the cavity margin and filling, which is necessary to insure the welfare of the operation, while this is

in progress. Dr. Poundstone, in a series of experiments conducted last year and reported at the Illinois State Dental Society (DENTAL DIGEST, Jan., 1905, p. 1) and at the Congress in St. Louis, also bore evidence to the inefficient qualities of cement used in this manner. And in my own experience I find very few fillings anchored by a lining of cement between the filling and cavity walls that have been in service a few years but what when opened up will develop a layer of softened or decayed dentin,

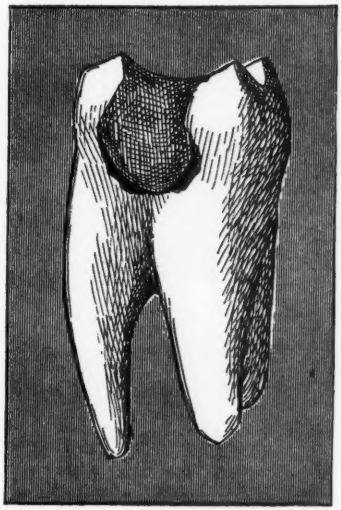


Fig. 4 represents a recurrence of decay at the lingual and bucco-gingival angles as a result of their not being extended lingually and buccally sufficiently to place them in a self-cleansing area.

showing that the expansion of the cement has caused the separation of the filling from the cavity margin, which permitted the ingress of secretions and bacteria.

With this evidence of the inadvisability of the use of cement in this capacity, it appears to me that for a dentist to employ it in any tooth with sufficient structure to afford anchorage for the filling in the tooth structure is conclusive evidence of his inability to prepare a cavity capable of retaining the filling, or a lack of energy and honesty to perform a conscientious operation for the salvation of the tooth.

Another source of failure in the class of operations under consideration is that of lack of extension of the cavity margins to an area where cleanliness is maintained and susceptibility removed. Had Dr. G. V. Black never written but upon this one subject, its value to dentistry should have immortalized his name throughout the ages of time in the profession. How often we see fillings placed in the proximal surface of the bicuspids and molars where the lateral cavity margins have been extended only beyond the line of decay, which left them in contact with the adjacent tooth, and

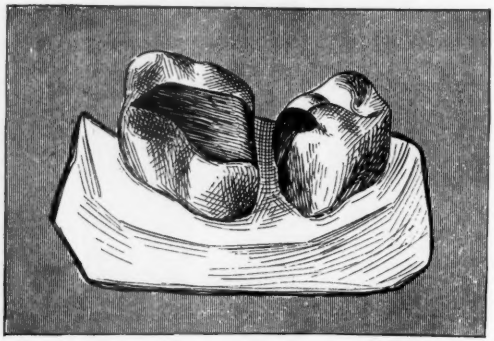


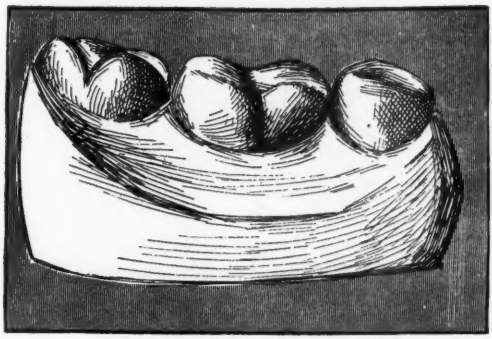
Fig. 5 represents a proximo-occlusal cavity in both first molar and second bicuspid, the occlusal portion of crown being inclined toward the mesial surface, which has guided food particles into the interproximal space, causing an increased separation between the teeth and absorption of both the gum septum and alveolar process; at the gingival margin of the bicuspid a pocket is formed by the wedging of the food into the space, which caused a recurrence of decay at the gingival margin of the filling.

after the lapse of only a few years we find decay recurring along the lateral or gingival margins.

Should the opportunity present itself for a comparison in the same mouth of a filling with the cavity margins extended to the self-cleansing area—or, as is often the case, in the same filling—one margin having been extended to an area of cleanliness, the other left in contact with the adjacent tooth, the one in contact with the adjacent tooth will be found to be decaying, while the one extended to where the motion of the lips and tongue in their natural movements, and the morsels of food passing over them

in the course of mastication, all tending to maintain cleanliness, remains unattacked by the ravages of decay.

The lingual, buccal and gingival margins of a cavity in the proximal surface should always be extended to where they are accessible to the usual means of cleanliness. The linguo-gingival and the bucco-gingival angles are points that probably are more often neglected in cavity preparation than any other, especially by those who are trying to practice "extension for prevention." The usual form of a cavity being circular, these angles are very often allowed to curve somewhat instead of carrying them on a parallel line of the long axis of the tooth. This leaves an area

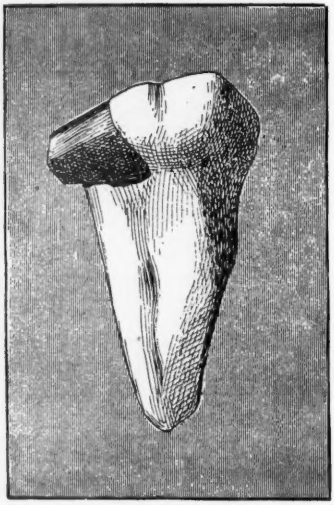


In Fig. 6 we have a gold crown upon the first molar, which is in contact with the second molar at the gingival margin, forming a wedge-like space between the two teeth for the reception of the food in mastication, which is very annoying and sometimes distressing and painful.

of tooth structure at these angles that is especially susceptible to decay, while if the buccal and lingual margins were made parallel with the long axis of the tooth, that portion most susceptible to decay would be covered by the filling and the danger of recurrence of decay very largely removed. I think it is perfectly safe to say that a filling made in a cavity without the cavity margins and angles being extended to the so-called self-cleansing area will not exceed five years of usefulness in the majority of cases, unless it be in the mouth of a person in whom immunity to decay has become a fact.

Another and very frequent source of lack of success in our

operations is the failure to remove those portions of enamel which overhang the cavity, and especially those subject to the force of mastication and which are not supported by a good layer of sound dentin. In the occlusal portion of these cavities we very often have the form of the cavity left by the progress of decay with heavy walls of enamel which appear to be capable of withstanding a great amount of stress, and when we undertake to remove them with the chisel it is often only by the employment of considerable force that they yield to our efforts. Thus we are often led to



In Fig. 7 we have a disto-proximal cavity in a molar filled with amalgam without the aid of a matrix, resulting in the large, irregular, overhanging margin at the gingivæ, which remained a source of irritation to the gum tissues for years.

believe that they afford sufficient strength within themselves to make it perfectly safe to let them remain, and if capable of withstanding the amount of stress we assume that they do, we would be perfectly justified in doing so, but as time passes we find that in many instances our opinions were poorly founded, we have the misfortune of finding that what we had thought was abundantly able to withstand the stress of mastication has broken and left a serious defect in our operation, where the accumulation of food

particles has taken place, and decay, through the fermentation of the accumulated products, at once began along the cavity wall. In this instance we were misled as to the strength of the tooth structure left by our failure to recognize the line of cleavage of the enamel rods which we were attempting to remove, and had we with a sharp chisel brought force to bear upon the line of cleavage we would have readily displaced it and saved ourselves the humiliation of the operation coming to grief. Then instead of building the filling under an arch of overhanging tooth structure we would have had direct access to the cavity, which is always of great importance, if not an absolute necessity to a perfect operation.

The removal of unsupported enamel is absolutely essential in all positions of the tooth, whether upon the occlusal surface, upon the buccal or lingual walls, or upon the gingival margin—not only because it has not sufficient strength to withstand the stress of mastication, but because it does not possess gold enough that can be built against it without its fracturing or breaking under the force of condensation. Should we recognize its weakness and, in order to maintain it in position, make the condensation lighter, then we have a poorly condensed and more or less porous filling, not capable of excluding the moisture, which in time shows dark through the enamel, and soon the filling is lost in the vast number of failures that mark the pathway of life. Besides, there is nothing added to the strength of the operation, and only a small amount of gold and time and labor saved in placing it. Why, then, should we jeopardize the entire operation by leaving this unsupported enamel where there is a reasonable doubt of its ability to stand the necessary condensation of the filling?

While much depends upon the preparation of a cavity in a successful operation, there is probably equally as much depending upon the restoration of the tooth to its normal contour. This is more especially true in the class of operations under consideration than any other, and vast numbers of well-made fillings have failed because of the faulty environment caused by the failure to restore the tooth to its normal form, more especially the mesio-distal diameter, for while this produces conditions that invite the recurrence of decay, it also produces diseased conditions that endanger and often cause the destruction of the soft tissues, and not infrequently does it result in the destruction of the alveolar

process. Whether our failure to restore the mesio-distal diameter of the tooth fails to bring the teeth in contact with each other, or whether for want of space between the teeth we are unable to restore them to their normal mesio-distal diameter, the results are equally disastrous, not only to the teeth involved in the operation, but also to the surrounding tissues. While the conditions would produce very different results, they are equally disastrous to the health of the parts, and hence to be severely condemned.

If we fail to restore the tooth to its full normal contour, and the teeth do not fall together, thus not closing the space, then the open space left as a result of our error is continually inviting the entrance of fibrous foods, which when forced upon the gum septum in the process of mastication produce great annoyance and often severe pain, and result in the absorption of the septum and often the alveolar process. Again, pockets are formed at the gum margin, in which the food particles decompose and many times result in the destruction of the tooth structure at this point.

One of the very important reasons for restoring the tooth to its normal form is the means it affords us of protecting the interproximal space, which is of great importance in the maintenance of a healthy gum septum. The septum in its normal condition occupies a position that is always more or less endangered by its environment, making it susceptible to injury. If the normal interproximal space is maintained, then the septum occupying that space presents an oval form linguo-buccally that is especially valuable in keeping the particles of food out of the space, thus maintaining cleanliness. A healthy gum septum is also of great value as a means of protection to the gingival margin of the cavity when that margin is placed, as it should be, in such position that the healthy gum tissue rests above it, preventing the lodgment and accumulation of food particles at that point. Where recession of the gums has taken place to any considerable extent, as is often the case in persons of middle age or past, this would be entirely impracticable, but when it can be placed beneath the gum margin without an unnecessary sacrifice of tooth structure it should always be done.

Another important reason for restoring a tooth to its proper form is that we may retain the normal lingual and buccal embrasures and secure the many advantages that are to be obtained

thereby. If we neglect the building out of our filling to its full contour, and the teeth move close together, then we are compelled to place the lingual and buccal cavity margins farther lingually and buccally, in order to place them in a position where they are self-cleansing and have them beyond the area of susceptibility to decay. If we permit the teeth to fall closer together these embrasures are much narrower, and consequently do not permit of as free gliding of the food over the surfaces of the teeth and through these spaces in mastication as when they have retained their normal width. It also makes the linguo-gingival and bucco-gingival angles, which under the most favorable conditions are susceptible to redecay, even more so, for by narrowing the embrasures, and the teeth falling closer at the gingival margin, these angles of the cavity are more inaccessible and all means of cleanliness are less successful in accomplishing the object of our labors.

Then we have the interproximal contact point, which is never to be lost sight of in an operation in the proximal surface of bicuspids and molars. This should be brought up to a round, marble-like surface, and unless we restore the tooth to its normal mesio-distal diameter it is impossible to obtain such a contact. On the contrary, we are accustomed to finding many fillings of which the contact is very broad, often being one-half the linguo-buccal diameter of the tooth. In these the fibrous foods have a greater tendency to cling between the teeth, for the contact point is generally not only broad linguo-buccally, but is also usually found to extend one-half the distance to the gingivæ, forming a broad, flat surface which does not permit of cleanliness and is also accompanied by a narrow, contracted embrasure.

Again, we find this same form of contact placed one-half the distance to the gingivæ, and the occlusal portion of the filling made to incline so that instead of the food being guided into the mesial and buccal embrasures, it is directed into the interproximal space and there wedged, one particle upon another, until much pain is caused and often violent inflammation is produced.

Then we will find another in which the contact is at the gingival margin, with the V-shaped space inverted and the apex pointing to the gingivæ. These also produce the same distress as mentioned above, and not infrequently do we find that considerable

absorption has taken place in both hard and soft tissues in the interproximal space as a result of the wedging of food into these artificial spaces.

Another source of failure in these operations is leaving an overhanging margin of filling material at the gingival margin of the cavity. This more often occurs in operations with amalgam than with gold, and especially do we find it where no matrix is used in packing the amalgam into the cavity. You doubtless have seen many of these cases where the filling material has been crowded into the interproximal space, and there it acts as a source of irritation to the soft tissues. In the bicuspids we often find the tendency toward bifurcation at the gingival margin of the cavity. These places being concave, the matrix, unless forced into contact with the tooth, admits of filling material passing between matrix and tooth into the interproximal space, and is frequently left in this form, the irregular shape of the mass being a continual source of irritation to the soft tissues.

The third division of my subject, performing the operation, has many sources of failure, and possibly none contributes more to lack of success than inaccessibility to all portions of the cavity. How to thoroughly condense gold against a cavity wall to which direct access cannot be had is beyond my comprehension. Those of the distal surface are difficult to properly fill when all overhanging margins have been removed, and unless the cavity is so prepared that we are enabled to condense the gold against the walls, we are almost sure in the course of time to find it admitting moisture about the margins, resulting in decay and loss of the filling.

In condensing the gold we should always work from the center to the cavity wall. If we begin the condensation next to the wall and work toward the center the tendency will be to draw the gold from the wall, where it is already hardened under the force of the mallet blows. If you lay a piece of iron on the anvil and strike it in the center you see the ends turn up at once from the contraction of the molecules of iron due to the blow, but if we continue from the center to the end the strap of iron lies flat upon the anvil. Begin at the end, however, and each blow from the hammer, passing from the end toward the center, causes the iron to rise higher at the end. While this is not so noticeable in

the gold, owing to the first blow fastening it to the previous layer, the tendency is the same—the gold is drawn away from the cavity wall, and all the malleting you can do will not place it in contact with it, as it would have been had the condensation been begun in the center, and a better margin will be made by finishing the malleting at the cavity wall.

In condensing the gold care should be exercised not to use the plugger on the enamel margin until there is sufficient gold there, so that when the blow is made the enamel will not be shattered under it. Many fillings are lost because of the operator's failure to observe this.

It is very interesting to notice the difference in the density of gold fillings from various operators. Some are readily picked to pieces, while from another you can scarcely remove a piece without removing the whole; in fact, it seems to be a solid mass, as though welded under heat. When the condensation is poor and the filling is readily picked to pieces, it is principally due to the instrument used being too large for the force of blow from mallet to condense the gold beneath the plugger point. The majority of points used are too large to condense the gold as thoroughly as it should be, unless a heavier blow from the mallet is given than the patient is able to bear. The tooth, resting upon a vital membrane, is capable of standing only a limited blow without producing pain; hence it is necessary for us to regulate the size of the plugger point by the amount of force upon the tooth endurable by the patient. If we reduce the blow and continue the large plugger we have a poorly condensed filling, and if placed in the mouth of one capable of exercising great force in occlusion it will yield under the stress brought to bear upon it. A filling placed in a bicuspid or molar where there are indications of ability to exert great stress in occlusion should have a specific gravity of at least 18, and this may be obtained in any mouth where such indications exist, unless there is inflammation of the peridental membrane, and where such a condition exists the operation should be postponed until it is restored to health.

To Stiffen a Platinum Pin.—Platinum and platino-iridium at times are too weak for posts, whether plain or threaded. To strengthen and stiffen either, flow over the entire surface a thin layer of 18 or 20 carat gold plate or solder.—*Dent. off. and Lab.*

SURGICAL BACTERIOLOGY OF THE MOUTH.

BY A. H. LEVINGS, M.D., MILWAUKEE, WIS. READ BEFORE THE SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION, 1905, AND PUBLISHED BY COURTESY OF THE JOURNAL OF THE ASSOCIATION.

In this section, devoted as it is to stomatology, I think that we all must admit that the bacteriology of the mouth should play an important rôle. The subject is of importance to the physician because here we find local manifestations of many constitutional diseases, such as influenza, diphtheria, smallpox, varicella, measles, scarlet fever, tuberculosis, syphilis and scurvy, in some of which at least the specific microorganisms may be found in the oral cavity. There are also a variety of pathologic processes which occur within the mouth or adjacent bones, many of which are due to pathogenic microorganisms. Among these may be mentioned tuberculosis, actinomycosis, osteomyelitis, thrush, anthrax, erysipelas, ulcerative and gangrenous stomatitis, pyorrhea alveolaris, and caries of the teeth. To any one who is doing mechanical or surgical work within the mouth the subject is of interest because of the frequency and variety of germs encountered, and, as is well known, these germs may at any time, unless precautions are taken, infect the wounds made. This fact I have seen most painfully and forcibly illustrated by the death of two patients from a most virulent pyogenic infection following the extraction of a tooth.

With the inspired air, with the food and drink taken from our fingers and from foreign bodies introduced into the mouth, a great variety of pyogenic and pathogenic germs gain an entrance to this cavity. The natural warmth and moisture of the mouth, as well as the organic matter so frequently present, then make it a most favorable site for the growth of bacteria. This is true even in healthy persons who do not properly cleanse their mouths, but especially so in those whose oral cavity is the site of some pathologic process.

A very commendable work has been done in the bacteriology of the mouth by a number of investigators. Among these may be mentioned Miller of Berlin, Vignal, Fluegge, Sanarelli, Netter and others. These results have not been uniform, as one might readily expect, for even in the examination of healthy mouths there is a

wide difference in the bacterial contents. For the purpose of carrying on these investigations, the subject was divided into five parts. The first class included clean mouths; the second, ordinarily kept mouths; the third, filthy mouths; the fourth, tobacco chewers' mouths, and fifth, mouths in which there were distinct pathologic processes.

In the examination of the first four groups, one hundred swabs were taken from different individuals, dividing them as equally as possible into the different groups. The first twenty swabs were taken from mouths which were sweet and clean and in which the teeth were well preserved and clean. These swabs were washed in a normal salt solution and then used as a medium for further study. First hanging drops were studied. In all instances the hanging drops showed thousands of bacteria of different forms and shapes. Micrococci were found in all of the mouths examined and varied somewhat in size and number. The most frequent were staphylococci, which were present in every case examined, and in fifteen of the twenty cases examined, micrococcus tetragenus was found, while in six of these cases sarcinæ were discovered. Of the bacilli, all shapes and sizes were found. Some of these were motile and others non-motile. Some of them were spore-forming and others non-spore-forming; of the spirillæ, both long and short were found.

These salt solutions were then plated on agar and gelatin and incubated for further study. On all of the plates the colonies were too numerous for study and it was found necessary to make dilutions of 1 to 100 in order to get fewer colonies for individual study. These colonies were stabbed off and agar, bouillon, gelatin and Dunham's solution, lactose and glucose bouillon, fermented tubes, lactose and glucose agar shake cultures made, besides milk and litmus gelatin. By a minute study of these cultures it was shown that thousands of bacteria noted in the first examination were innocuous; also, that all but the streptococci (noted in two cases), bacillus coli communis (found in three cases), bacillus subtilis, staphylococcus (found in all the cases), and the micrococcus tetragenus (found in fifteen cases), were non-pathogenic. Of the non-pathogenic germs a large number were acid and gas producers. Many, though, were species of putrefactive bacteria. There were also a large number of microorganisms which could not be identified,

but which seemed to correspond with those described by Miller of Berlin.

In making a study of thirty ordinarily kept mouths, they were found to differ from those well kept by the fact that the microorganisms were much more numerous. This was especially marked where small pieces of putrefactive matter were present in the cavities of decaying teeth. The majority of microorganisms in these cavities were, however, putrefactive germs, and as they grow with great activity they may kill out the other germs. In two of the thirty cases the bacillus of influenza was also present.

In the majority of the filthy mouths there were pathologic processes going on, such as decayed teeth, suppuration of the gums or small ulcers. In two cases thrush was present. In all of these filthy mouths there were millions of bacteria, and a much larger per cent. were virulent. The pneumococcus was present in ten of the thirty cases. In the cavities of decaying teeth large numbers of acid producers and putrefactive bacteria were present. In the cases of pyorrhea large numbers of both staphylococcus pyogenes aureus and albus were found. In three cases of abscess staphylococcus pyogenes aureus was demonstrated. In two of these there was also staphylococcus pyogenes albus, and in one staphylococcus pyogenes citreus. In a large number of these mouths micrococcus tetragenus was also present. In a great many cases putrefactive germs were well pronounced and gas formation very marked. The foul breath in these individuals is probably due to the obnoxious gases given off by the activity of these germs.

An examination of tobacco chewers' mouths shows that they are more filthy than the ordinary filthy mouth. It also proves that the tobacco has no restraining influence on the growth of bacterial activity. The majority of these mouths were pathologic and contained decaying teeth, small ulcers and suppurating processes about the teeth. It was not apparent that the tobacco was the cause of the decay, only that the individuals were less careful of conditions in their mouths.

Examinations were next made to determine the number of bacteria thrown from the mouth in ordinary conversation, forced, explosive expiration and in coughing.

A plate exposed for two minutes just in front of the mouth during ordinary conversation showed 235 colonies. A plate exposed for

one minute at the distance of five feet during forced expiration showed 105 colonies. A plate exposed for one-half minute at the distance of five feet during explosive expiration showed 192 colonies. A plate exposed at a distance of ten feet showed 35 colonies after five forcible coughs. A plate exposed at a distance of 20 feet showed a development of 23 colonies after ten forcible coughs. These examinations were made in a bathroom which had no ventilation and which was practically free from germs, so that a plate exposed for five minutes in quiet showed the development of but three colonies. In other experiments plates were exposed at the distance of five feet and coughed at five times forcibly with one, two and three thicknesses of gauze in front of the mouth. The plate exposed with one thickness of gauze in front of the mouth showed a development of 156 colonies. The plate exposed with two thicknesses in front of the mouth showed a development of 35 colonies, and the plate exposed with three thicknesses in front of the mouth showed a development of 8 colonies.

In the following cases are given the results of examinations of the bacterial contents of special pathologic processes:

Case 1.—A child 3 months old. A swab was taken one day after an operation for hare-lip, before cleansing the mouth. The swab showed the presence of staphylococcus pyogenes aureus and albus and the micrococcus tetragenus in large numbers. There were also many non-pathogenic bacteria. After the mouth had been cleansed by washing it with peroxid of hydrogen in water, 1 part to 3, a swab was taken which showed the staphylococcus pyogenes aureus still present, only in much fewer numbers.

Case 2.—Epithelioma of the lower lip. Swab taken before cleansing showed staphylococcus pyogenes aureus and albus and citreus, the streptococcus pyogenes and large numbers of putrefactive germs, as well as many non-pathogenic bacteria. After a thorough irrigation with normal salt solution, a swab was taken which showed an absence of the streptococcus, also the diminution in number of the other germs, although they were still present in great quantities.

Case 3.—Carcinoma of the upper jaw producing ulceration of the gums. A swab taken before cleansing indicated a large number of acid producers, putrefactive bacteria, staphylococcus pyogenes aureus, albus and citreus, a number of streptococci and micrococcus tetragenus. Large numbers of fungi of different kinds were also

found on this swab. The one taken after irrigation with normal salt solution showed little improvement in the bacterial contents of the mouth.

Case 4.—Epithelioma of the tonsil. Swab taken before cleansing the mouth showed thousands of bacteria of all kinds and shapes. There were present the staphylococci pyogenes aureus, albus and citreus, large numbers of streptococci pyogenes and also the pneumococcus. The swab taken after the cleansing with normal salt solution showed a great reduction in the number of germs, but the pus cocci were still present in small numbers. The pneumococcus could not, however, be demonstrated.

Case 5.—Epithelioma of the cheek. Swab taken before cleansing showed a great number of germs of all sizes and shapes and also a great number of fungi, including yeast fungus. The majority of these germs were putrefying bacteria. The pus germs in this case were present, but not so numerous. After an irrigation with one-half gallon of normal salt solution through a fountain syringe, the swab taken showed but few pus cocci, while the putrefactive germs and the fungi were greatly reduced in number.

Case 6.—Sore mouth in child. Swab taken before cleansing showed numerous bacteria, some of which I was unable to identify. There were also large numbers of actively motile bacilli, as well as acid and gas producers. After cleansing with a mild antiseptic but very few bacteria remained.

Case 7.—Sore throat. Swab taken before cleansing showed numerous staphylococci and long threads of streptococci. The swab taken after gargling for five minutes with a teaspoonful of an antiseptic solution in a small glass of water showed very few pus germs and these seemed innocuous, for they would not grow on culture media.

Case 8.—Acute pharyngitis. Swab taken before cleansing showed a large number of staphylococci, streptococci, also the bacillus of influenza and Friedlander's bacillus. Swab taken after cleansing with antiseptic gargle showed numerous staphylococci and streptococci, but these seemed innocuous, as there was but one thin growth of staphylococcus pyogenes aureus.

Case 9.—Canker of the mouth. Swab taken before cleansing showed numerous forms of bacteria, including staphylococci and a

large branching fungus. Swab taken after cleansing with peroxid of hydrogen was negative.

Case 10.—Patient had had both tonsils removed several days before examination. Swab taken before cleansing showed great masses of staphylococci and streptococci. The streptococci could not be cultivated. The staphylococci on cultivation proved to be staphylococcus pyogenes albus and aureus. Swab taken after cleansing with peroxid of hydrogen showed only a small number of staphylococci which were grown with great difficulty and did not fully regain their power of growth until they were transversed three times onto fresh nutrient agar and incubated at 37 degrees.

Case 11.—Girl, 19 years of age. Patient has consumption and several cavities in one lung. Swab taken before cleansing mouth showed a large mass of bacteria, pus cells and epithelial cells. A simple cover-glass smear stained for tubercle bacilli showed them to be present in large numbers. There were also large groups of staphylococci and long threads of streptococci, and in addition to these numerous ordinary forms of bacilli and fungi. The presence of pneumococcus was demonstrated. The swab taken after cleansing the mouth and throat with antiseptic showed staphylococci and streptococci, a few tubercle bacilli, together with some pus cells. These germs, however, could not be cultivated.

Case 12.—Girl, aged 10 years. Part of tonsil, soft palate and part of posterior wall of pharynx covered with an adherent, grayish-white membrane. Swab taken before cleansing showed, besides numerous other bacteria, the presence of the bacillus of diphtheria. Swab taken after brushing with peroxid of hydrogen and then cleansing by gargling with a teaspoonful of peroxid in a glass of water showed numerous bacteria, including staphylococci and many bacilli, but none of them would grow.

Case 13.—Pyorrhea alveolaris. Swab taken before cleansing showed, besides large numbers of bacteria, most of which were gas and acid producers, the presence of masses of staphylococcus pyogenes albus which was grown in pure culture. Swab taken after cleansing with lysol indicated but very little change except in numbers, the bacteria growing quite as well after the cleansing as before.

Case 14.—Swab taken from a cavity in a carious tooth showed a great mass of bacilli and fungi. On cultivation, the bacilli were

found to be composed of masses of the proteus group, of which the proteus vulgaris was isolated and the bacillus acidi lactici obtained in pure culture.

Case 15.—Sarcoma of the lower jaw with very little ulceration. Swab taken before cleansing showed, besides masses of pus cells and epithelium, large amounts of disintegrated tissue, also large quantities of bacteria, staphylococci and streptococci. The two latter seemed, however, to have lost a great deal of their virulence, for the putrefying germs soon outstripped them in growth. Swab taken after imperfect cleansing with a carbolized solution still showed the presence of bacteria of different sizes and kinds, but they would not grow, owing probably to the presence of carbolic acid.

Case 16.—First stage of pyorrhea. The swab taken before cleansing showed considerable blood and enormous masses of bacteria of all descriptions. These included staphylococcus pyogenes aureus and albus.

Case 17.—This patient had had his lower jaw resected two days previously on account of a sarcoma. Swab taken before cleansing showed masses of pus cells and epithelium, also masses of bacteria of all shapes and sizes, together with long threads of fungi. There were staphylococcus pyogenes albus, also micrococcus tetragenus and bacillus pyocyaneus. A swab was taken after cleansing with an antiseptic solution, and showed some diminution in the number of microorganisms.

Case 18.—Same patient. Swab taken before cleansing four days after operation showed about the same condition as in previous instances, but the swab taken after thoroughly syringing the mouth with peroxid of hydrogen and then washing out with a normal salt solution showed no visible growths.

The next study was made to ascertain the comparative number of bacteria present in healthy mouths before and after different methods of antiseptization.

First.—Thoroughly scrubbing the gums with a stiff brush and warm soap water, after rinsing thoroughly with a normal salt solution and rubbing with a sterile gauze from two to five minutes. This will render the mouth sterile in two out of five cases and will reduce the number of germs in the other mouths from thousands to only a few colonies.

Second.—Rinsing the mouth with mild antiseptic, such as boracic acid, thymol, 30 per cent. solution of alcohol or a weak solution of chloroform. It was found that simply rinsing the mouth had little effect on the bacterial contents. This seemed to be due in a large measure to the secretions of the mouth, which come rapidly and neutralize the antiseptic used. If the mouth was first scrubbed well and then an antiseptic used, a practically sterile condition was obtained.

Third.—Disinfectants were next tried and the mouth thoroughly rinsed with either 1 per cent. carbolic acid solution or 1 per cent. solution of formaldehyd or a solution 1 to 10,000 bichlorid. After the rinsing, the mouth was scrubbed, using the normal salt solution, and the result was found to be practically the same as in the first method described, that is the mouth was rendered practically sterile.

To summarize briefly gives us the following facts: In twenty examinations of clean mouths, the greatest number contained staphylococci, fifteen micrococcus tetragenus and six sarcinæ; of the bacilli, all shapes and sizes, both motile and non-motile, spore-forming and non-spore-forming, and long and short spirillæ were found. Streptococcus was noted in two cases. Bacillus subtilis, bacillus acidi lactici and bacillus butyricus were also found. In one instance bacillus prodigiosus and in three bacillus coli communis were found. In all the cases large numbers of gas and acid producers were present, also several species which could not be identified. In eight of the cases the pneumococcus was found.

The study of ordinary kept mouths showed more bacteria than in well-kept mouths, the putrefactive microorganisms being especially numerous. In two cases of this group the bacillus of influenza was discovered.

In the third group, the filthy mouths, are found many pathologic processes. In two there was thrush and the organisms of this disease demonstrated. In these filthy mouths millions of bacteria were present and a large number were virulent. The pneumococcus was found in ten of the thirty cases. In the cavities of teeth large numbers of acid producers as well as a great many putrefying bacteria were found.

In the tobacco chewers' mouths, no new organisms were found. In two special pathologic conditions, the staphylococcus pyogenes albus and aureus, and the streptococcus pyogenes were found. The

micrococcus tetragenus was frequently present. Acid and gas producers, putrefactive bacteria, sarcinæ and fungi were found. Numerous cocci, the yeast fungus, the bacillus of influenza and Friedlander's bacillus were isolated. In diphtheria and in consumption the germs of these diseases were shown to be present in the mouth.

From the foregoing experiments it is apparent that the number of microorganisms, both pyogenic and pathogenic, usually present in even healthy mouths is considerable. While in filthy mouths and those which are the site of pathogenic processes, the number and variety of microorganisms are greatly increased.

These experiments, though very incomplete, seem to indicate that mechanical means are most to be relied on in an effort to render the mouth sterile, and that the disinfectants, with a possible exception of peroxid of hydrogen, are of only secondary value.

Discussion.—*Dr. J. Marshall,* San Francisco. said that those having any experience in handling fractures of the jaw note that about 90 per cent. of all compound fractures of the jaw suppurate. He has operated on those patients without any more disinfecting than washing out the mouth, but has learned from experience that if the mouth is thoroughly cleansed and all salivary deposit removed, and the mouth thoroughly washed with an antiseptic solution, and appliances put in, followed by antiseptic treatment throughout, it is possible to reduce very materially the number of cases in which there is suppuration after the injury. He performs many operations for fractures of the jaw by suturing the jaw, and when he first began he did it with fear and trembling, thinking that in all probability he would get infection through the openings in the bones for the wire sutures. At first he thought that he had, but later found that the trouble originated before that. In most of these cases the patient is not seen for from a few hours to several days after the injury, and infection has already taken place. In cases lasting but twenty-four hours, he has only had 4 or 5 per cent. following compound fracture. The fact was emphasized that if mouths could be kept absolutely clean, dental caries, pyorrhea, inflammations, gingivitis and stomatitis of any kind would be impossible. He does not think we have yet reached the point where we really understand the value of clean mouths. He thinks that if more time were spent teaching patients the value of prophylaxis more good would be done. The work should be begun with chil-

dren, as it would prevent much trouble later on. In his work in the Presidio at San Francisco Dr. Marshall found the mouths of the soldiers in a most horrible condition. He had some placards printed and put up in public places, "Clean teeth do not decay," and others, "Do not ask the dentist to treat your teeth until you have brushed them." The difference in the condition of the teeth of those men who were there for some time was surprising. Many of them had never owned a tooth brush. After educating them awhile they came with clean mouths and with less disease.

Dr. G. V. I. Brown, Milwaukee, said that in the first place it is an interesting fact, known perhaps, but not considered sufficiently, that if one had been performing a surgical operation in those several mouths and could not or did not use antiseptics, he would probably so far as pus germs are concerned, have better results in the dirty mouth than in the clean one. With Dr. Brown it is a grave question sometimes how much or how little good antiseptic measures do. Until someone can demonstrate that it is not valuable to disinfect he, of course, will continue on that line, but if those who have demonstrated that there are properties in this saliva or this mixed secretion that have a beneficial action in health, then of course it must be admitted that by the dilution of that fluid injury is done rather than benefit. Dr. Brown made some tests years ago in the following manner: Taking cultures from mouths that were not disinfected in any way—so-called dirty mouths—he, of course, obtained a great deal of bacteria. Disinfecting with bichlorid for a considerable time in some instances gave practically no result in cultures taken. Following this a solution of carbolic acid was used, stronger than he should want to use for operative purposes, and some essential oil, and after all this he was able to get growths from cultures taken from the same mouth by scraping away some of the superficial cells; he found living germs underneath. He found that he could get good results by using peroxid of hydrogen, which is also a germicide, but is superficial. By using this and then a germicide, he obtained better results. Mechanical cleansing, H_2O_2, and then a germicide gives the very best results. It is a foregone conclusion that a state of pure asepsis cannot be reached. Even if it were, at any moment it is likely to be disturbed by secretions of one kind or another. The only thing left to do, therefore, is to use as much mechanical force in cleansing as possible, and

then to depend on the frequent use of dilute solutions of antiseptics and germicides.

Dr. M. I. Schamberg, Philadelphia, said that this paper should be a valuable adjunct to medical as well as to dental literature for the reason that it will recall the general surgeon to the urgent need for protecting the patient in laparotomies, brain surgery, etc., from infection from the mouth. Careful operators who have spent much time in preliminary preparations are frequently seen to stand over a patient with open abdomen and describe the conditions there, and it is quite likely that they frequently cause infections with germs from the mouth.

Dr. M. L. Rhein, New York, said that Dr. Levings' views differ materially from our clinical experience with tobacco mouth. It has always appeared to Dr. Rhein that the consensus of views is that a tobacco mouth, other things being equal, will present a decidedly smaller number of colonies on examination than another mouth. It is known that however sterile the oral cavity is made the durability of that condition is extremely limited. The one practical point to Dr. Rhein has always been that with the average practitioner, whether he be distinctly a stomatologist or a medical man, failure in this respect is due to a lack of cleanliness. The advantage of a method approaching a condition of sterility as closely as possible is of undoubted value, and the whole point resolves itself into a question of time. The practitioner has not the time to devote to this purpose.

Dr. G. V. I. Brown declared that the value of experiments with regard to infection from mouths covered with gauze is far-reaching. In clinics in some of the best institutions in this country, surgeons and nurses with rubber gloves may be seen and every possible precaution against infection is taken, and the surgeon, perhaps, may have a beard or moustache uncovered; at any rate his mouth has no special cleaning, and yet he will discuss the cause and talk right over the open abdomen. Some surgeons are more particular and do cover their mouths. The piece of gauze already prepared to drop over the mouth is advisable. Dr. Brown covers his face with several thicknesses of gauze and thinks that this is a very important point.

Dr. John Marshall stated that for the last few years in most of the large hospitals these precautions have been followed, the sur-

geons covered their mouths not only with one or two thicknesses, but with four or five, particularly when performing laparotomies.

Dr. Vida A. Latham, Chicago, asked Dr. Levings how he overcame the tremendous ingrowth of the sacromycetes group. Dr. Latham has just finished a number of experiments in the oral cavity and said that she has been practically overwhelmed with the yeast growth, and that the yeast organism is a prominent organism in the mouth. She also asked Dr. Levings what position he gives to the B. coli communis, and whether he is inclined to class it as an allied form to the streptococcus. It has been shown that the coli communis is allied to the pus group. If such is the case, this is a cause of peritonitis, cellulitis, etc.

Dr. H. P. Carlton, San Francisco, asked what is the use of having training schools for dental nurses if there are no medical dentists.

Dr. A. H. Levings (closing discussion) stated his belief that the bacteriology of the mouth is better understood, as it should be, by the dentist than by the physician, and that the former is a better judge of the bacteriologic contents of the mouth than are physicians ordinarily. He is not aware of any experiments that bear out the statement that the tobacco mouth has fewer organisms than any other mouth. He believes that these arguments are advanced by persons who use tobacco. He classes B. coli communis simply as a pus germ—as a pyogenic germ—one of the germs that are most frequently to be dealt with in the intestinal canal and in the abdomen, and certainly it is largely a pus germ. It is the cause of nearly all the pus abscesses in the abdomen. Dr. Levings has found it in many cases in pure culture in abscesses about the appendix, intestinal canal and gall bladder. The yeast germ, he believes, is not found in sufficient quantity to interfere with investigations. If experiments prove anything, they prove that all mouths are filthy, in the sense that they contain pyogenic or pus-producing microorganisms. In order to render a mouth reasonably aseptic, it is necessary to do something more than gargle or wash; it must be scrubbed out, and on this point he disagreed with Dr. Brown that after rinsing and gargling the mouth masses of bacteria can be scrubbed off from the gums. These particles of foreign materials containing the microorganisms must be detached by mechanical means, and after that the mouth can be made aseptic and can be

kept practically clean by the use of antiseptics. In the education of the dentist, Dr. Levings believes that there are many branches of medicine which are practically useless, and that the prospective dentist is the only individual to be considered. What is good for the dentist is going to be good for the public. When the dentist is properly educated, he is in a position where he can deal most satisfactorily with the public.

THE ORAL MANIFESTATIONS OF DIABETES MELLITUS.

BY HERMANN PRINZ, M.D., D.D.S., ST. LOUIS, MO. READ BEFORE THE SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION, 1905, AND PUBLISHED BY COURTESY OF THE JOURNAL OF THE ASSOCIATION.

Within the last twenty-five years a vast amount of literature has been produced concerning the etiology, pathology and therapeutics of pyorrhea alveolaris, and, with it all, to-day we are about as far away from its true etiology as in the days of Celsus, who probably was the first medical writer to call attention to this ailment. To J. M. Riggs of Hartford, Conn., American dentistry is indebted for first calling the attention of the profession to this disease in 1869, although it must have been recognized by him as early as 1844. Rehwinkel is usually quoted as being the first (1877) to use the term pyorrhea alveolaris, a name which he borrowed from Albrecht of Berlin. This term, however, is of French origin and is employed for the first time in an article published by Toirac-Desirabode, in 1839, in which he speaks of the disease as *pyorrhea alveolodentaire.* Fauchard, in 1746, described this disease as a "kind of scurvy" and Jourdain (1778) seemed to be of the same opinion, although he more particularly emphasized the fact that a pyogenic destruction of the gingivæ and alveoli is concomitant with the other symptoms. Ever since innumerable names have been suggested by the various writers, usually christening the ailment according to their conception, with the most prominent symptoms, such as "cemento-periostitis" (Magitot), "arthro-dental gingivitis" (Galippe), "gingivitis expulsiva" (Marechal de Calvi), "caries alveolaris" (Essig), "interstitial gingivitis" (Talbot), "atrophia

alveolaris prœcox" (Baume), "phagedenic pericementitis" (Black), "syphilitic locolosis alveolaris" (Curtis), "caries alveolaris idiopathica" (Greve), "caries alveolaris specifica" (Arkoevy), "blennorrhea gingivæ," etc., etc. At the last Union meeting of the American Dental Societies of Europe, held at Basel in December, 1904, W. J. Younger of Paris suggested these two names: "Alveolitis calcophagia" and "alveolitis calcica."

For convenience sake, we may define pyorrhea alveolaris as a chronic destructive inflammation of the pericementum, with more or less necrosis of the alveolus of the affected tooth. The causative factors of the disease, according to Miller, may be classified as follows: Predisposing causes, local disturbances, and bacterial infection. The predisposing causes are such factors which lessen the resistancy of the tissues to injuries, viz., constitutional or local diseases, metabolic disturbances, tuberculosis, rachitis, scorbutus, syphilis, locomotor ataxia, chronic dyspepsia, malaria, diabetes mellitus, metal intoxications, and other disturbances. Some of these enumerated diseases do not produce definite symptoms in the oral cavity; others, again, manifest themselves in the causation of a distinct form of pyorrhea alveolaris, which, according to some clinicians, is classed as a prodromal sign of the primary disease. This seems to be especially true of diabetes mellitus.

Diabetes mellitus is a disease of impaired nutrition. Faulty metabolism, resulting from the materially reduced power of the body to burn up grape sugar, is the causative factor. Postmortem examination of diabetics usually shows very few or no morbid changes of the organs, with the exception of the brain. The sequence of this inhibition of chemical changes in the body is the presence of sugar in the blood of the diabetic which results from the diminished destruction of the sugar, and, as a consequence of this incomplete oxidation, oxybutyric acid, aceto-acetic acid and acetone are formed, which, with the sugar, are excreted with the urine. The nervous system being the controlling factor of the chemical changes in the muscle tissue, it seems proper to suspect certain disturbances which originate in the central nervous system as the primary factor of diabetes mellitus, the more so as certain pathologic signs point in this direction. The fact is verified by performing the classical experiment of Claude Bernard, which consists in puncturing the floor of the fourth ventricle midway

between the auditory and the pneumogastric nerves. Thus, an artificial diabetes, which is to say, passage of large quantities of sugar with the urine, is produced which may last for several hours. It is a long and well-known fact that pathologic disturbances of the pancreas are responsible for the production of diabetes; von Mering and Minkowski operated on more than fifty dogs, and, when the complete extirpation of the pancreas had been successfully carried out and the animals had survived more than twenty-four hours, well-marked and severe diabetes was produced. If small pieces of the gland remained, however, no symptoms of diabetes were manifested.

According to our present conception of oral pathology, we may take this axiom for granted: There is no pyorrhea alveolaris without microorganism. The normal oral cavity is inhabited by a rich flora of bacteria, both pathogenic and non-pathogenic. The great resistancy of the very vascular tissues to injuries holds the bacteria at a rather low ebb of virulence. According to Fluegge, however, the slightest interference with this normal resistancy, for instance, a simple pharyngeal catarrh, affords a ready field of attack and the pathogenic germs become extremely virulent. No specific microorganism has, so far, been isolated as the true causative factor of pyorrhea alveolaris, although Galippe claims to have found and isolated two organisms. Pyorrhea results from a mixed infection; as shown by Goadby, however, the true pus-producing organism, viz., the staphylococcus aureus and albus, are found only in about 10 per cent. of all the bacilli present. As before stated, these microorganisms must necessarily find a *locus minoris resistentiæ* in the tissues of the oral cavity before they can obtain a firm foothold.

It is a well-known fact that diabetes mellitus lessens the resistancy of all the tissues of the body; diabetic gangrene and a tendency to form carbuncles are ample illustrations of this. So-called dry sockets, viz., ill-healing wounds resulting from the extraction of teeth, are frequently traced to existing diabetes. According to Naunyn, the pronounced tendency to local infection in diabetics may be partly explained by the ever-present sugar in the tissues, thus furnishing rich food to certain forms of schizomycetes. This may help to explain why thrush is so frequently seen in the mouths of diabetics. The best authorities on diabetes mellitus, such men

as Kuelz, von Noorden (Autointoxication), Frerichs, Bunge (Physiological and Pathological Chemistry), Naunyn, etc., agree that no sugar is found in the saliva; however, a distinct acid reaction is usually observed in the oral fluids. This very acidity, to a large extent, is responsible for the increased sensitiveness about the necks of the teeth, which is usually a forerunner of rapid decay about this region. The circular ligament becomes swelled and livid, it loses its hold on the tooth, and thus opens a ready gateway to the microorganisms. The formation of pus pockets follows and concomitant destruction of the peridental membrane and necrosis of the alveolus results, with final loss of the tooth. The teeth of the upper arch usually are attacked in this manner prior to the lower teeth.

According to Arkoevy (Caries Alveolaris Specifica Fulminans, Stomatologiai Koziony, 1905), a distinct separation of the two upper centrals occurs which, as a pathognomonic symptom, he has termed *diastema pathologicum.* The articulation of the arch is destroyed, and as a consequence of the force which is produced by the more firmer teeth of the mandible, in their curve of motion against those of the maxilla, the latter readily give and more or less prognathism results. The percussion fremitus of Landgraf (*Kritische Betrachtungen über Pyorrhoea Alveolaris.* Deut. Monat. f. Zahnheilkunde, 1903. Die Initialsymptome der Alveolarpyorrhea. Ibid., 1905), which is observed by placing the finger over the end of the tooth root and tapping the tooth, forms a valuable diagnostic means of determining the progress of destruction of the alveolar plates.

The very rapid formation of calcareous deposits about the necks of the teeth in diabetics is another important diagnostic symptom. This "tartar" is usually of a light yellow color and rather soft to the touch. It is not confined to a group of teeth, but forms indiscriminately all over the crowns. The rapid formation may thus be partly explained: The saturation of the body with acids, according to Naunyn, calls forth an increased neutralization by the alkaline earths of the tissues which are largely held in solution by carbonic acid and poured out by the saliva. The CO_2 becomes liberated in the mouth and the precipitated lime salts are deposited about the teeth. The tongue of the diabetic is usually found thick, of a red color, and coated, showing the imprints of the teeth; the papillæ are enlarged. The mucous lining of the mouth shows a livid color

resulting from the hyperacidity of the blood; the mouth is usually extremely dry. The typical odor arising from the breath of the diabetic is an important clinical symptom of the disease and is readily observed by the oral specialists. It is a peculiar chloroform-like odor, resembling somewhat sweet cider. This odor is due to the acetone compounds formed in the body. Of course, the most important diagnostic sign of diabetes is the presence of sugar in the urine.

A few therapeutic suggestions added to the summary of oral symptoms of diabetes mellitus may not be amiss. For general treatment the patient, of course, should be under close observation of the physician. The imbibing of large quantities of alkaline waters, such as Vichy, Carlsbad or Neuenahr, is recommended by the best authorities. Strict dieting is preeminent, and von Noorden's "oatmeal cure" is much lauded by some clinicians. Very recently O. Conheim published encouraging results obtained by administering an extract of the pancreas; this report, however, is too early and too incomplete to be of practical value. The local therapy is the usual routine treatment, removal of all deposits, destruction of the pus pockets, fixation of the loose teeth, correction of malocclusion, and general prophylaxis. As long as the primary disease is present, however, comparatively little can be expected of the local treatment alone.

AMALGAM AS A FILLING MATERIAL.

BY GEORGE ZEDERBAUM, D. D. S., CHARLOTTE, MICH. READ BEFORE THE MICHIGAN STATE DENTAL ASSOCIATION, AT DETROIT, JULY 12, 1905.

Amalgam, as everything else in the way of filling material, has its good and its bad qualities; has its friends and its enemies.

It is not my purpose to uphold the operator who uses lots of amalgam, and who, when it comes to anterior teeth, always finds them too soft and not capable of being filled with gold, but uses cement periodically until finally the tooth must be cut off and crowned; nor is it my aim to side with the chronic gold worker, who perhaps does not do any amalgam work, but spends all his energy and taxes all his and his patient's strength by malleting for hours on a disto-occlusal cavity in a second upper molar; nor

is it my desire to reflect upon the porcelain worker, who is so enthused with his material, which is certainly ideal in many ways, that he uses it to the total exclusion of all others. Personally, I am neither overenthusiastic nor extremely conservative over amalgam, and the object of this paper is to outline with absolute fairness the value of amalgam as compared with gold and porcelain.

A short history of amalgam ought to be of interest, inasmuch as no other filling material has caused so much controversy as it has. It has been in use since 1826, and was brought to the United States by two Frenchmen in 1830. It had to fight its way from the first, and if we are to judge by the output of that material by all the dental houses to-day, we can truthfully say that amalgam has won its battle and has come to stay, inasmuch as this great supply is certainly caused by a correspondingly great demand.

Now let us see what some of the most eminent of our profession have to say relative to amalgam:

Dr. G. V. Black says: "Amalgam produced by the best makers possesses many good qualities, yet is inferior to gold in all."

Dr. Jonathan Taft says: "Of all the metals that have been used for filling teeth, gold possesses more of the requisite properties than any other; sufficiently so for all practical purposes."

Dr. G. A. Bennett's article in the American system of dentistry reads: "Gold having the largest number of required attributes has always been and still is the most useful metal for filling teeth. Perhaps the most general rule that can be given to amalgam is this—keep it out of sight."

Dr. J. S. Marshall says: "Amalgam is generally used under those conditions and circumstances in which a permanent filling is desired, but in which gold is inadmissible either from the inaccessibility of the cavity, the frail condition of the tooth, the physical state of the patient, or the inability of the individual to pay for the more expensive service."

To sum it all up, none of these gentlemen are overenthusiastic in their opinions of amalgam, and still we use it daily, and its output, as I said before, is steadily on the increase. Surely it is not because of its bad qualities that it is so lavishly pressed upon the public. It must have some redeeming features as well!

Some of the good points of amalgam may be summarized as follows:

Apparent adaptability to walls of cavities.

Resistance to attrition.

Edge strength.

Conductivity of thermal changes not so high as that of gold.

Working qualities and ease of manipulation.

Less time in placing.

Less expenditure of force required.

If a filling is properly made, the amalgam we are using at the present time will not discolor the teeth.

Slight cost of material.

Amalgam is of especial value in that class of cavities in which the cervical margin lies at some distance beneath the border of the gum; also in large disto-occlusal cavities of second and third molars, which by reason of their location, their size and frail walls, or the physical condition of the patient, would not allow of a gold filling or gold or porcelain inlay being satisfactorily placed.

On the other hand there are some bad qualities of amalgam; for instance:

It is not entirely indestructible in the fluids of the mouth, but oxidizes or sulphurets.

Resistance to the force of mastication is not so good as that of gold.

Color is bad; inadmissible for that reason for anterior teeth.

Much careful study and experience are required to work it well. (Neutral point.)

Cavities to be filled with amalgam successfully must always have four surrounding walls.

Ordinarily, perfection of adaptation is less certain than in case of gold.

There is danger of occasional mercurial necrosis from too many amalgam fillings in one mouth. (See Brooklyn Med. Journal, Dec., 1898.)

Owing to cheapness, too many of us handle it carelessly.

Lactic acid-producing germs are not excluded by amalgam.

Too many inferior alloys on the market.

In comparing amalgam with gold fillings, I believe that we put in entirely too many amalgam fillings, where gold ones would give

far better satisfaction. It is true that gold requires more skilful operating from beginning the preparation of the cavity to the final polishing of the filling, but there certainly are conditions, as before mentioned, where amalgam would be of better permanency than gold. Let me say here that one point in the operative procedure is decidedly neglected by the majority of practitioners and that is rubber dam. Many amalgam fillings would be perfect to-day, had they been put in as they should have been. To wilfully neglect the application of the rubber dam is unpardonable. I distinctly remember how fixed on this point was Dr. Black, when he insisted on rubber dam for even shallow occlusal pit cavities. This vulnerable point certainly should not be passed over lightly, especially by those who even do not employ the compressed air.

As to the life of amalgam fillings I do not know what to say, for so much depends on conditions. I know I have had two very large amalgam fillings in my mouth since 1899 and that to-day, without any extraordinary care, they are there as bright and with as smooth margins as you could wish for. When properly placed and under at all favorable conditions amalgam fillings serve well.

Before we compare the value of amalgam with a gold inlay, let us first compare the large gold filling with the gold inlay.

If the insertion of a good gold filling requires great skill and manipulative ability then a good gold inlay requires still more dexterity and sense of touch. The making and the inserting of a gold inlay is a decidedly more pleasant and less tedious operation than a large gold filling. We can place a gold inlay with a fair degree of assurance of permanency in teeth of young patients, giving them all the benefits of cements without their disadvantages. Then again, in cases of devitalized posterior teeth where as a natural sequence we have to deal with frail walls, we can protect these walls by inlays better than with any gold filling that can be placed in them.

From these few points I mention (and there are many more), we can see that a gold inlay is a good thing, and in many cases better than a gold filling. The main drawbacks, as I see them, are, the cutting away of so much sound tissue to enable one to perfectly draw the burnished matrix occlusally; contraction of solder in cooling, for few can master this feature, and the trouble with cement; this latter is also a weakness in the porcelain inlay

work. As repeatedly shown by experiments and clinical experience we learned the fact that we as yet lack suitable material with which we can hermetically secure our inlays. Cement washes out in many cases, especially where it has been allowed to cover the cavo-surface of the enamel. This dissolves with greater or less rapidity, all depending on some peculiar idiosyncrasy of the patient, so that scarcely any time elapses before the inlay has to be again cemented to place. However, I regard the gold inlay as superior to the gold filling, and as the gold filling has been universally allowed supremacy over the amalgam filling the natural deduction is that a gold inlay is better than an amalgam filling, all conditions being equal.

Next we come to the comparative value of an amalgam filling and the porcelain inlay. I am not going into relative merits and demerits of the porcelain inlay versus amalgam filling. Each has its respective place in the mouth and these two certainly ought not to conflict. Amalgam has its place for the posterior teeth, while the field for porcelain inlays, with occasional exception, should be confined to the anterior teeth, and only to such of these where there is or there can be made sufficient space, and where the stress is not great and sufficient retention can be secured in simple buccal cavities where we are perfectly safe so far as the stress goes.

While the porcelain is by far more artistic than either the gold inlay or the amalgam filling, and while it is also more compatible with tooth structure, it also has its faults and its limitations. I will enumerate just a few, such as chipping, which frequently occurs (no edge strength), for even from a good joint cement will sometimes wash out and the crushing strain from the opposing tooth will chip the unsupported porcelain, thus inviting accumulations of food and further decay and further washing out of cement, at times entirely loosening the inlay. Many porcelain inlays discolor at the margins, which is also due to partial dissolving out of the cement. We cannot place porcelain inlays in posterior teeth with as great certainty of success as we can amalgam. Further, we know that dentin is permeated with a lactic acid fermentative process in advance of decay and for that reason we are never positive that the filled cavity will not have to re-opened and the tooth treated. Imagine the removal of

a mechanically well placed porcelain inlay from a very sore tooth. Patient would rather lose the tooth than be obliged to sit while you pry, drill and otherwise try to dislodge such an inlay. On the other hand, amalgam could be readily drilled out with a sharp drill, which might be an advantage in such a case for amalgam over the porcelain inlay.

In closing I wish to express my belief that, although amalgam is a cheaper material, requiring less manipulative skill than either gold or porcelain, there is no reason why its insertion should be less carefully or less conscientiously performed.

I do not pray for amalgam fillings, for we have too many of them already, but I certainly do plead for better cavity preparation, better placed and better finished amalgam fillings.

PORCELAIN AS A FILLING MATERIAL.

BY HENRY C. RAYMOND, D. D. S., DETROIT, MICH. READ BEFORE THE MICHIGAN STATE DENTAL ASSOCIATION, AT DETROIT, JULY 12, 1905.

It will be the purpose of this very brief paper to try and enumerate the advantages that porcelain possesses over gold and amalgam as a filling material.

The three principal features or, I might say, advantages that porcelain has over gold are, first: Its quality as a preservative of the teeth. Second: Its application is effected with much less exhaustion to both patient and operator. Third: Its almost ideal harmonious effect in matching the natural teeth.

The term compatibility has been used by one of the most earnest and successful operators in porcelain, when accounting for the superior qualities it seems to have over other materials in preserving the teeth, and though the term has been questioned by some as being incorrectly applied, I know of no other word that so aptly covers the need. Porcelain seems to more closely resemble tooth substance than anything we have. Its glazed surface is the best substitute for the enamel. In texture, in color, and in resistance to the thermal changes it is more like the natural teeth than is anything else. It does not tarnish as do the metals, and when a perfectly adapted porcelain filling is cemented into a cavity, it forms a more homogeneous addition to the tooth than any metal

filling, however perfectly the latter may be inserted. These features, which porcelain possesses in a marked degree more than any other material, do seem to sum up a compatibility with healthy tooth substance and the surrounding tissues, and for want of a better term, is used to account for its success in arresting dental caries.

A leaking porcelain filling, unless loose, is an impossibility, something which cannot be said of gold or amalgam. We all know how difficult it is to put in a water-tight gold filling. Examine all the gold fillings you desire and see how few are free from discoloration at the margins and of the surrounding tooth structure, due to moisture and decomposition beneath the filling. Even many of the gold fillings put in by the most able operators are not free from that dark line surrounding the filling, and in many instances extending well beneath it. This defect is what makes many gold fillings so unsightly in the anterior teeth, presenting as they do the yellow metal and the darkened enamel and dentin adjacent. It is hardly necessary to add that such fillings are not saving the teeth. We frequently see teeth with large gold fillings in which the enamel is transversed by one or more cracks or checks, which were not present before the filling was inserted. In some instances the cracks were caused by excessive malleting, but frequently they are caused by the expansion of the metal against the unyielding enamel; large amalgam fillings will bring about the same result when put in without a cavity lining. It cannot be wondered at that such fillings prove failures in a comparatively short time. Nothing could be more incompatible with tooth structure than the metals, and the wonder is that they have saved so many teeth as well as they have. Sound reasoning and good sense should demonstrate that porcelain is an infinitely better material for the preservation of the teeth, and experience has proved that such deductions are not only logical but are actually clinical facts.

How great a strain is the insertion of a large gold filling on the vitality of the operator, and how exhausting to the average patient, it is hardly necessary to mention, as many patients and operators know too well. While it may take longer to make and insert some porcelain fillings than would a gold filling, many do not take any longer than would gold for the same cavity, and in

any case it is much easier for both patient and operator, as the rubber dam is rarely required and much of the work is done out of the mouth. When using porcelain we are using a material that fulfills more than does anything else the requirements of a permanent operation, and one that is harmonious with nature in effect, and with a minimum physical demand on both patient and operator. That, I think, is almost ideal dentistry. Many teeth under gold fillings and some under amalgam are so annoying from thermal changes that the metal has to be removed and replaced with something of a less irritating nature. In many instances the pulp must be devitalized before comfort is restored. Dead pulps with their attendant evils under metal fillings are a common occurrence, especially in the anterior teeth where the protection of the pulp by the dentin is only slight. This rarely occurs with porcelain. In fact, when a metal filling has been removed, owing to the discomfort caused by the irritation from thermal changes, and porcelain is used in its place, the operation is usually followed by complete comfort and the pulp is preserved. There are many teeth which could not be saved with a metal filling which would have to be crowned, with of course the loss of the pulp. Such teeth may frequently be saved for many years with porcelain, and the pulps preserved in a healthy condition. The average operator is seldom sure that his gold operation is a perfect one, and there are many defects that he is not aware of because he cannot see them. When a porcelain filling is ready for the cavity it can be seen at a glance whether it is defective or not, and, if necessary, another can be made, thus ensuring an accuracy of the operation which is very satisfactory. The use of porcelain has been objected to by some on the ground that it is so difficult to manipulate, but I think that the man who can make a gold filling can, if he will take the time to master the technique of the work, make an equally good porcelain filling. Even the average operator with the right instruction and ground work will succeed in making a creditable showing in porcelain, and in either instance he will make a more beautiful and permanent operation. A good porcelain filling will save a tooth better than the best gold filling that can be made, and a poor porcelain filling will preserve the tooth much longer than would a poor gold filling.

Some writers have asserted that while porcelain is an ideal

filling under certain circumstances its field is decidedly limited. I cannot help repeating here a statement I made some time back, though a writer about a year ago dubbed it as absurd: "The application of porcelain as a filling material is only limited by the ability of the operator." There are very few places in the mouth where it cannot be used successfully if the operator has thoroughly mastered his work, in fact, I know of no material that can be so extensively used with such satisfying results. Objection has been made that in many locations the margins break away, and that in many instances the cement dissolves out and leaves a space for food and moisture to gather and decompose. When the margins break from porcelain, it is usually the result of faulty occlusion, or, owing to wrong method in cavity preparation, frail, weak margins result in the failure. With an inlay perfectly adapted to all portions of the cavity, and its margins, it is impossible for enough cement to dissolve out to permit space sufficient for anything to lodge that will undergo decomposition. The fine line of cement seen when the filling is set does wash or dissolve out, but only to a certain depth, when the space becomes so narrowed that moisture cannot penetrate any farther.

I have rarely seen decay around a porcelain filling, though I have seen many poor ones, and some that have been in nearly twenty years, and some even that have had the margins badly broken away for years. Can the same be said of any other material?

I have said iittle of the beautiful, natural appearance of porcelain and the difference it makes in the expression of the mouth and face as compared with gold. Even if it were not so good a preserver of the teeth as it is, it would still have a strong claim to its place in the anterior teeth, and very many would rather have it even if it had to be renewed quite frequently. It is almost debasing to a profession, the members of which are supposed to be refined and esthetic, to disfigure and mar the face with glaring yellow metal as has been done, and is still being done to a certain extent.

I have said little of amalgam, as I hardly think it can be considered in connection with porcelain when all the advantages of the latter are summed up. The only advantage that amalgam possesses over porcelain is its ease of manipulation, which enables us to use it in some cavities that it would be almost impossible to

fill with anything else, owing to their inaccessibility. Though I am an ardent advocate of the use of porcelain, it must not be understood from what I have said that I do not think that other materials have any place in our work. The most successful dentist is the one who avails himself of whatever will bring the best results in a given case, always providing that he is thoroughly conscientious in his deductions, and places first and last the patient's best interest above everything else. Such is the faith I have in porcelain as a tooth preserver and because its effects are so in harmony with nature that were I confined to but one material for saving the teeth, porcelain would be that material.

GOLD AS A FILLING MATERIAL.

BY J. L. SWEETNAM, D.D.S., MANISTEE, MICH. READ BEFORE THE MICHIGAN STATE DENTAL ASSOCIATION, AT DETROIT, JULY 12, 1905.

This subject is assigned to me for a short paper for your consideration to-day. Having stowed away twenty pounds of gold during the past twenty-five years, I am glad to have this subject. Gold is the most valuable material that has ever been used for the purpose of filling teeth. I say the most valuable advisedly, for no other material has the wide range of usefulness possessed by gold. Unfortunately it is also the most abused filling material we possess.

When we stop to consider the high order of manipulative skill required to produce good results with gold, how little wonder we are constantly striving to find something to take its place. This effort has not been entirely wasted, for because of it other materials have been found with limited ranges of usefulness.

I do not consider it necessary for me at this time to say anything about the physical properties of gold, so will confine my remarks to some conditions which need to be carefully discussed.

First, more time should be devoted to the training of the hands to properly manipulate gold so as to produce fillings that will resist the great strains to which they are subjected.

Second: The underlying principles of the formation of cavities be studied by dentists with great profit.

Thirdly: The different forms of gold used in filling teeth can be studied by individuals with great profit.

I said in the first place that more time should be devoted to training the hands to properly manipulate gold to a texture that will resist the great strain to which fillings are subjected. Have you ever stood by watching others put gold into a cavity, and felt sorry for them? I have, not once but scores of times; sometimes I have taken their instruments, squared their work and started them over, but to no purpose; they had not the capacity they should have acquired before starting practice. To play well a musical instrument requires early training. If you will permit me to cite an illustration. I have a daughter fourteen years of age, who plays the violin beautifully, having started to practice at seven. If she makes an error I can detect it at once, for I understand music and play other instruments, but I could not take her violin and produce any music. I have had assistants, graduates of our best schools of dentistry, say in despair, "What seems easy to you is impossible with me." I believe this is largely due to a lack of early training, and you may now readily see what my argument is: Gold having no specific value in itself as a filling material, its usefulness depends upon the skill of the operator to so adapt it to the walls of cavities that it effectually excludes the active influence of decay-producing agencies. If this is true, it is equally important that we have the walls of cavities so shaped that we may adapt it more securely. This brings us to the second argument. The underlying principles of the formation of cavities to be filled with gold are, that it is absolutely necessary to have good strong walls to build against and a flat or secure foundation to build upon; a concave surface will not answer. The base of the filling must be flat, both on account of the filling and on account of the tooth, and every part of the cavity must be accessible to manipulation. If all portions of the filling are to be properly condensed the operator must be able to get at them. We too often try to do the impossible. A properly constructed separator should be placed between the teeth during the packing of gold in proximal cavities whether it is needed for the purpose of separation or not, which it generally is, as it is needed to study the tooth being filled and helps to give a clearer view and a freer operating space. Let us briefly consider the different forms of gold used in the filling of teeth under the three general heads of cohesive, non-cohesive and crystal or mat gold.

Everyone should know something about the merits and demerits of each.

I want to make the broad assertion that no man who has become eminent as a successful conservator of teeth ever built his reputation on crystal gold, and yet there are dentists all over this land trying to fill teeth with this stuff. Some use it in the bottom of cavities, claiming it is easier to start with. There is no easy way to insert good gold fillings, and I condemn every practice of that sort as a makeshift that will end in disastrous failure in time.

Now and then we run across an advocate of non-cohesive gold, who will tell us what wonderful things were done with it in the good old days before cohesive gold was known. They have extracted teeth that had been filled for "forty-six years" with non-cohesive gold. Generally it will be found that any old thing would have preserved those same teeth just as well. Non-cohesive gold does not have the necessary strength for the average filling, but it may have a useful place, which in my judgment is very limited. If it is used at all, it should have the quality of being made cohesive by annealing when used; in other words, have it clean and free from contamination of any sort. Any cohesive gold will become non-cohesive by subjecting it to the fumes of ammonia for ten or fifteen minutes. Then if wanted cohesive again, you have only to drive off the gas with heat and you know that you are using a clean gold. Cohesive gold makes the best fillings when it is properly condensed with finely serrated pluggers with faces slightly convex. Such fillings can be inserted that will stand all the strain to which they will ever be subjected in the mouth.

Careful attention should be given to the annealing of gold. If the electric annealer cannot be used for lack of current, a piece of mica over a spirit lamp will do just as well. Keep your gold clean and make sure it is thoroughly cohesive. A good deal is said relative to the advantages of hand pressure over mallet pressure. To my mind there is no necessity for conflict between the two methods of condensation, they are both necessary in almost every filling. Personally, I prefer the hand mallet in the hands of a well-trained assistant, then the amount of hand pressure that is required will not be over-fatiguing to the operator.

The gold should be placed where desired in the cavity and condensed, we not to depend upon any spreading under the plugger

by any force that can safely be put upon it. The result after finishing a perfectly packed gold filling should be a surface like a mirror.

The greatest value of gold as applied to children's teeth is not to use it at all. If our mission as dentists is the preservation of the natural teeth, we must not put gold in children's teeth. I would make it an offense punishable by law for a dentist to ever insert gold in the teeth of patients under eighteen years of age. If possible I would like to emphasize this with more force. It is cruelty to our little patients and it is worse than useless in their teeth. If the truth as we know it were told our patients they would not demand it, for the teeth are not dense enough to stand the strain necessary to properly condense the gold. If it could be properly condensed it would not save the teeth, for the reason that the tubuli of the dentin are so large that moisture will get in around the filling in time and you all know the result.

To summarize briefly, the value of gold as a filling material depends upon three things: Proper formation of cavity, quality of gold, and skill in manipulation. If these matters receive proper attention, I would say that no other material has the value of gold as a filling material.

DISCUSSION OF PAPERS ON FILLING MATERIALS BY DRS. ZEDERBAUM, RAYMOND AND SWEETNAM.

Dr. Parmenter: One point which was not brought out very clearly and which I think calls for more attention is the polishing of amalgam fillings. I think we ought to put just as nice a finish on every amalgam filling as we would on a gold filling, for several reasons. A well-polished filling causes less trouble from food collecting on its surface, and whenever a filling begins to give way around the margins it is much more easily detected if the amalgam filling is polished smooth than if it is left as crystallized when not polished. If we have an examination of our fillings once or twice a year, it is much easier for us to determine what fillings are giving out. If they are left rough we can never know what fillings are commencing to leak, and they may leak quite a bit or almost come out before being discovered. The first amalgam filling that I believe I ever saw polished was the

work of a dentist in Butte, Montana. That was five or six years ago, a bicuspid in which the contour had been nicely restored and the tooth was nicely finished, and I said, "That dentist takes pride in his work." Since then I have polished all my amalgam work, and find that the results much more than repay the extra time and expense, for my patients are willing to pay an extra fee for that kind of work, and it is much more satisfactory.

Dr. N. S. Hoff, Ann Arbor: I am very much pleased with these papers. They have resulted in exactly what had been planned, and I should congratulate myself on the selection of the men to write on these subjects, because they have presented exactly what I think we need, and the subjects have been presented from their respective standpoints very strongly. I would like to carry the prophylactic idea along this same line of work. I do not know what is to be the future of the porcelain inlay or amalgam. I hope and expect that we shall have all these materials at our command and will make use of them for a long time, and suspect that if this prophylaxis treatment comes into public favor, as it seems now destined to do, that we shall make better fillings with both amalgam and gold than is now the case.

I also anticipate that during the next few years we will be putting more porcelain fillings in the posterior teeth than any other kind. This may seem strange to you, and it may seem as if it is a mistaken statement to make. We are testing out this porcelain inlay filling at the present time. I think if it is possible to insert porcelain fillings in the anterior teeth and they will stand the pressure, we will be led to make these fillings, and if we can do this there is no filling, in my judgment, that is better adapted to assist and help on this subject of prophylaxis than porcelain. It is the filling which has an ideal surface; a surface which will not accumulate the extraneous materials from the mouth or produce infection of the gums. It is the one filling that it seems to me has a future in that direction if it is practicable to adapt it to the molar and bicuspid teeth; it will then be adopted by all the better practitioners simply from this standpoint of prophylaxis. I anticipate that this matter of prophylaxis is going to be, in the future, one of the most important points of our practice. It is not going to be everything; it will not do away with the present filling materials, but we will shift

our methods of depending upon gold, for instance, which has always been the standard of the skilful operator, to porcelain.

The scientific research work that is being done upon amalgams, and the great effeort which is being made to develop better filling materials, will result in an ideal filling material. If this prophylactic idea prevails, and men are induced to make more careful operations with amalgam and more careful observation of the teeth, placing them in proper form that they may be cleaned easily and kept clean by the mouth toilet of the patient, amalgam has come to stay also, and we shall have three excellent materials with which to do filling work. I think, with Dr. Zederbaum, that amalgam has its place, and the amalgam of the future is going to be vastly better than the amalgam of the past. I do not believe it is possible for any one to insert gold in the posterior teeth, particularly in the mesial surfaces of the lower molar teeth, and to polish such fillings so that it is possible to keep them free from extraneous deposits. It is, however, practicable to do that with porcelain. It is easier, it seems to me, to secure smooth surfaces there with amalgam.

If we ever secure an alloy that is hard and dense and will retain its position, and not flow from the physical changes which take place in it, causing it to bulge out or pull away from the margin, and which will make a close joint and can be highly polished, I do not know but that it may supersede gold, and thus we may get beyond the gold stage. I am a gold operator myself and have tried to make just as good gold fillings as I knew how, but I believe we are going to do less gold work in the future than we have been doing. The future amalgam filling is going to be a much more careful operation than it has been in the past. We are not only going to take more care, but we shall use better material and be more particular about the kind of alloy we use, and we shall surely get better results. If these things come to pass, we will not be put out of business, for while we may not have more we shall have better amalgam fillings.

Dr. A. M. Long: I would like to take an exception to one statement in Dr. Sweetnam's paper, in regard to the age limit of 18 for gold. I have seen patients sixteen years old, or even fifteen, for whom I believe you could make a good gold filling, and I have seen people twenty-two and twenty-three in whom

I would not risk a gold filling. I think the individual tooth has got to be considered more than the age. When I find a patient whose teeth are soft and I have commenced operating, I frequently put in cement to carry that tooth along until it goes through a hardening process, which it will do under a cement filling. If we take *more care* to examine the condition of our patient's teeth when they are presented to us, we will do better work and make better fillings. No mouth should be dismissed without being properly cleansed. Not only the amalgam fillings that we make to-day but the amalgam fillings that have been made eight or ten years ago. A great many of them will expand and bulge out and require polishing just as much as if they had been made recently. We should go all over the mouth and take care of it. Those old fillings often call for our immediate attention just as much as the new ones.

I do not know how to estimate the porcelain fillings. I know of people that have had them in a good many years. I have had some in twelve years and am proud of them to-day. I believe that every dentist in this room would like if he could to dispense with gold. It is a precious metal and we have enjoyed it for years, but if we could use less gold there would be a much smaller amount go to the graveyards. If we can discover something that we can use easily and make it do our patients more service than gold or porcelain, we should do so and save our patients the expense.

Dr. W. H. Jackson: The term of usefulness of any filling is no longer than its weakest point. Whatever filling you use depends very much upon the condition of the teeth and mouth in which it is placed. So far as my own experience goes, a perfectly placed gold filling is the most lasting and the best preservative of the teeth of any material I have used. On the other hand, were it possible to take that gold and put it in a tooth in which the mallet or condenser would in the least particle displace any portion of the enamel in which it is placed, we might make an opening for the secretion to seep through the tooth and ultimately destroy the filling, so that the tooth would be worth nothing. The weakness of a gold filling is due in many instances to improper manipulation, because we know that the secretions do not disintegrate the gold. The weakest part of the porcelain

filling is the cement that holds it in the cavity. Find a cement that the secretions of the mouth will not act upon, and the porcelain inlay will be the ideal filling. There are persons in whose mouths cements will last eight, nine or ten years, but they are very scarce; on the other hand, you may put cement fillings into the mouth without the porcelain covering, and in a year's time all of them will show much solution and may need replacing entirely. We seldom see a mouth in which this is not true. If the saliva will act upon a cement filling, why should it not dissolve the cement filling which is between tooth and porcelain? The inlay will last just so long as the cement will hold and no longer. I have seen the work of some of the most expert operators, and some of the finest work that I ever saw in my life has failed in three years. Some inlays may last ten years, while, as we may expect, others last not more than one year because the cement dissolves out. I have seen amalgam fillings that have lasted forty years and they are in yet, and I have seen others that did not last three years. It is the intelligent judgment of the man who is doing the work that counts, the man who uses proper discretion in selecting for the place that which is proper. The same amalgam put in one person's mouth may last forty years, while in another person's mouth it may only last a small fraction of that time. The secretions of one mouth will act upon the filling whereas in another mouth they will not. We should be able to discern what will last in one mouth and what will not in another. We should by knowledge and experience be able to recognize conditions which are detrimental to every kind of filling, and thus discriminate in our selection.

Dr. M. L. Ward: I would like to call your attention to one thing in regard to shrinkage of amalgam. Dr. Jackson has just called your attention to the fact that you could get good results in one mouth and not in another. There are reasons for this which are not in the manipulation of the material. Alloys should have plenty of copper in them; the sulphite of copper is strongly antiseptic. Until ten years ago the cause of shrinkage was not determined, and it was not eliminated until that time. One of the first and important things in using amalgams is the selection of a proper alloy. It is easy to use an alloy with ten or eleven per cent copper to save all kinds of teeth. There are

other things in the use of amalgam which ought to be recognized, one being that amalgam fillings should be frequently polished. You cannot expect any of the alloy fillings to retain a high finish There is tin in all the alloys, which will not keep a high polish. You cannot expect one to hold a polish longer than one year, even though it may have a high percentage of silver. It will not be as permanent as a gold filling because it contains more or less mercury.

Dr. J. Q. Byram, Indianapolis: It seems to me in a large measure that this matter of filling materials resolves itself into the personal equation—what one man may do with a certain filling material may not be accomplished by another. Dr. Raymond stated that one of the disadvantages which is claimed for porcelain inlays is the difficulty of manipulation. I am frank to say that it is easier for me to construct a porcelain inlay than it is to insert a gold filling, while with many it is much easier to insert a gold filling, and, as Dr. Jackson said, no filling is stronger than its weakest point, I wish to say that that is the greatest advantage of the porcelain inlay. I dare say if we would examine all the gold fillings that have been inserted in the mouths here present, and all the amalgam fillings, probably we should find at least seventy-five per cent of them that are faulty. We consider a filling perfect when it is inserted and looks well. When we examine this filling carefully, and especially the amalgam filling, we find there are places where the filling leaks, and we know too well that we should have our patient return for repair, but we leave them year after year with fillings that in our hearts we wish were out, but we placed them and we haven't the nerve to tell the patient that the filling is faulty and should come out. With the porcelain filling as soon as that filling is faulty you do not need to acquaint the patient with that fact; he comes with it in his hand, and to me that is one of the greatest advantages of porcelain as a filling material, the fact that the patient knows immediately when any imperfection discovers itself. We are then compelled to reset the inlay in order to preserve the tooth. It is my belief that the inlay for the purpose of filling teeth is the correct principle, and I believe that the time will come when practically all teeth will be filled by that method, whether it be gold or porcelain. I believe that we can retain inlay fillings better

and without great sacrifice of tooth structure. In the inlay we have a filling that is less of an irritant to the pulp than when we rely on retention by carving grooves and retaining pits for the filling by the old methods.

I am sorry that Dr. Sweetnam took the stand that he did about non-cohesive gold, because I am a believer in non-cohesive gold. When I see the work that was done by such men as Taft, Keeley, Hunt and others years ago, it fills me with chagrin that I cannot do as well. Now he said that that was probably not due to the filling material but to the individual. I agree with him to a great extent, but believe the same gentlemen could have taken any other material, were it possible, and used it to as good an advantage and obtained the same results. I also wish to say that I am an ardent advocate of hand pressure for gold filling. If I had my way about it, the manufacturers of automatic mallets would go out of business. I think that more gold fillings are spoiled because of the fact that the margins are battered with the pluggers used in automatic mallets than is done in any other way, and if we should take the pains to insert gold fillings by hand pressure as we do other fillings, we should get the best gold fillings. I also believe that we shall always have three filling materials, amalgam, gold and porcelain. While, as I said before, the inlay principle will be the future practice, there will be cases where it is not advisable, for instance, in extremely small fillings I should consider it not advisable to use it. There are cases where amalgam should be used because of the inaccessibility of the cavity. I gave you my opinion as to porcelain this morning for bicuspids and molars. I quite agree with Dr. Hoff that it is the best filling to aid prophylaxis that can be used, and were it possible to overcome its weak point, this edge turning, then it would be the ideal filling for bicuspids and molars; and I will simply reiterate what I said this morning, and say that the nearest way to overcome that is to sacrifice enough tooth structure to carry the margins to a point where there is practically no strain applied.

Dr. T. J. Collins: We do not want to be led by the enthusiast; we want to be led by men of judicial minds. I cannot see why any man should stake his all on the gold filling, or on the

porcelain, or on the amalgam filling. Regarding the porcelain inlay, I believe that in the hands of skilful men it is good. A porcelain filling in many cases is useless and will not stand. There is one point that I want to bring before this society; it is with reference to the cost feature. It has been stated here to-night that the cost of the filling very often determines the use of amalgam. Should not the cost of the filling dominate, to a large extent, the kind of filling that is used? If you make a small inlay you can put it in at a less price than a large inlay; but a small gold filling you cannot. Are not a great many amalgam fillings made for the mere reason that they can be made at a less cost? I believe that the fee we receive to a large extent compels the use of amalgam for filling many teeth that would be filled otherwise if the fee were different.

Dr. C. H. Oakman, Detroit: In regard to automatic mallets. At every examination held by the State Board, each candidate for examination has from one to three automatic mallets, and in their operative work the success of their examination is largely due to those appliances. When it is not possible on a soft tooth to get a good margin and you use an automatic mallet the first piece of gold that goes in is likely to see a piece of the tooth chipped off. I saw the senior class in Ann Arbor operating. They were cautious and used the hand mallet and hand pressure, and I said: "Boys, don't you use automatics?" They said: "They do not allow us to have them." I daresay that we have men here to-day that can talk in favor of the automatic mallet, and I hope to hear from them. Expert operators do the best work by the use of such an instrument, but unless they are experts in its use, it is not a good thing to use. I do not believe that we can all use hand pressure and attain the same degree of success; one man will have strength in his wrist and can put gold down that the mallet will not change in the least. Where one man can do that, there may be ten who cannot. I insert a good many amalgam fillings, and lots of them I wish I had not inserted. I do not think there was ever an amalgam filling put into any tooth that did not sooner or later shrink or change form. The question we all ask is, what are the elements required in the perfect alloy, and where shall we get it? If we must use amalgam we should know what it is made of and who makes it.

A good formula well manufactured can be used to distinct advantage.

Dr. J. A. Watling: I have two amalgam fillings in my mouth that have been there 49 years next September. The way that amalgam was made I will tell you. A silver quarter was reduced to filings and then mixed with the mercury; tin foil was added, and that alloy made those two fillings. One of them is in a cavity of the second molar, and another on the distal side of the first bicuspid. Has there been any improvement in amalgam since that day? Have we any amalgams to-day that will stand the test of 49 years? If there are any, you have not proved it by the use of them, and I doubt very much whether any new researches are going to improve amalgam over what it was 25 years ago. Amalgam is simply a combination of the metals, tin, silver, copper and mercury, mixed together. If the fillings are put in properly and in proper places they will last for many years. These fillings of mine were put in 49 years ago, long before the days of rubber dam, absorbent cotton or anything of that kind. The cavities were simply cleaned by hand and wiped out with commercial cotton, and the fillings are good yet and will last till the end of my days, I have no doubt. I do not think there will be anything gained by the investigation of amalgam composition. We read in the journals about amalgam being an absolutely perfect filling material, and yet I do not believe there will ever be many fillings made of it that will last 49 years.

Dr. G. W. Shattuck: Standing here this afternoon listening to these arguments, the question arose in my mind whether we are going ahead or going back, or whether we are standing still. Over forty years ago there was held a convention out on Woodward Av.; it was the old American Dental Convention, and if I could get hold of a copy of the proceedings and read you some of the discussions I think you would find them about the same as has taken place here this afternoon. Always this same question. I do not see that we have made any progress. What great things we are going to do is for the future to find out. We still have our gold, cement and amalgam. We saved teeth forty years ago with these materials; we have examples of that to-day. With our hand drills we used to drill out the cavity. I first saw

rubber dam used in 1864 at this convention. Last night I was surprised at what was brought out under the discussion of prophylaxis. We used to have a little bit of a stick of pine or orangewood, and took the pumice stone and pounded it out on a bench or anvil and made our powdered pumice stone. We had to make our scalers of bar steel which we put in the flame and tempered. With these we scaled and polished the teeth.

Dr. C. H. Worboys: I should prefer to speak of the advantages of inlays, both of porcelain and gold, but I will refer to the discussion of other fillings. One of the reasons why some of our amalgam fillings fail so often is that we do not cut away weak walls enough. Too many of us are using the engine in place of a good heavy chisel. The same with gold fillings. You cannot make a gold filling stay where there is any stress applied to it unless you can thoroughly condense the gold into the retaining form of the cavity, and that gold must be cohesive gold on soft gold; non-cohesive gold will not hold. A gold filling properly made must be like a cork, just as perfect as it is possible to be made. My friend Oakman spoke of men having to be strong in the wrist to use hand pressure. I use hand pressure and I believe I get my gold so dense that a plugger would not make much of a dent in it. I use smooth points. I use no serrated pluggers with either hand pressure or with the mallet. My pluggers are all smooth; the gold possesses that peculiar quality of cohesion which does not neeessitate the use of serrations on instrument to make it cohere.

Porcelain I use a little. Out in the country we have to do everything. I think of porcelain, like all others who use it, as having some great advantages over anything else, particularly in incisors where a tooth is decayed very close to the cutting edge. There, with porcelain, it is not necessary to remove the incisal edge, where with gold you could not possibly put in the filling without knocking off the corner. If ever you have filled them with this kind of cavity you have filled them with cement, and they last for years with refilling. The corner remains, for by using porcelain in such cases you do not have to cut through to the incisal surface.

I am confident most of us use amalgam empirically. I do not

think there is one out of fifty of us that knows what we are doing when we put in an amalgam filling. It seems to me that the sooner I get the amalgam filling into the cavity after having mixed it, so as to have the initial set of it take place in the cavity, the better the results obtained.

So far as polishing fillings is concerned, there is no question about that, but there must be complete restoration of contour in all cases. In gold fillings in disto-occlusal cavities of molars and bicuspids, I think it is almost impracticable to put the gold to the mesial or pulpal wall of such cavities with the mallet. I believe it must be done by hand pressure, unless one uses one of those back-action automatics, although I do not know that I ever struck a piece of gold with one in my life. I do not know anything about the use of automatic mallets, but the hand pressure, with smooth plugger points and cohesive gold comes very near to being the only way to put in gold fillings. The mallet can be used with smooth points.

Dr. M. T. Watson: The automatic mallet has been scored pretty hard this afternoon. The trouble is that we do not know how to fill teeth with this appliance. I think you can fill any tooth by the use of the automatic that you can with any other instrument, and you do not need to chip the edges either; if you use proper care and prepare the edges right and understand the manipulation with the automatic mallet you can use it for any tooth, however frail.

Dr. J. L. Sweetnam: I was asked to read a paper on gold as a filling material. I did not say anything particularly about amalgam or porcelain, my subject was gold. I am a user of amalgam and have been since my early practice. Last year in the mouth of Dr. Henry Brophy of Chicago, now a dentist, I saw amalgam fillings that I had put in for him 25 years ago. Out of twelve fillings there were ten of them still doing service. I do not try to put amalgam in every place. Like porcelain it requires a good deal of skill to produce nice results. The porcelain inlay is a failure, I believe. I cannot afford the time to do this work all over the mouth. I feel that we are running the chance of having to re-cement those fillings in time, or of making new ones.

In regard to the age that gold should be used; I know a great

many are putting in gold fillings for children, and I have watched it carefully. Quite a number of years ago I was led to abandon gold in children's teeth and I put the limit at 18 years; now I would make it twenty years.

When patients apply to have their mouths put in order, the very first thing is to get their mouth in a healthy condition. We cannot work on teeth comfortably to the patient, or to ourselves, with the mouth in a filthy condition. The porcelain inlay probably has a place all right, and I have put forth as much effort as any man, of my age at least, in the effort to use porcelain. I have certainly used a great deal of amalgam, but I am very careful in making amalgam fillings. With large fillings in the back of the mouth, and also nearly all amalgam fillings, I have found it an advantage to use cement, mixing it quite soft; when the cavity is partially filled take out the cement, and make sure that there is no cement around the margin, and then go ahead and finish the filling with amalgam. The amalgam does not discolor the margin of the tooth. I still contend that of all materials that we use in teeth gold has the widest range of usefulness.

Dr. H. C. Raymond: In regard to what Dr. Jackson said, for instance, that a filling is not any stronger than its weakest point, of course the cement is the weakest point of a porcelain filling, and that fact in a way makes it the strongest point, for, as Dr. Byram says, you cannot have decomposition take place, and if the cement gives way your inlay gives way and comes out. Porcelain fillings do come out, and very frequently gold fillings come out, and when they do you have to enlarge the cavity, whereas a porcelain filling can be replaced in a very few minutes. If there is one thing more than another that would make me more in favor of porcelain, it is its value in prophylaxis. I believe that it is impossible to get a perfect surface with a metal filling, especially a gold filling. You can get a perfect surface with a porcelain filling; it does not tarnish nor take up accumulations of any kind, but keeps perfectly clean. I notice many good operators are coming to the porcelain filling. Dr. Hoff, quite a few years ago, was not of the same mind that he is to-day. I believe porcelain can be used in a back tooth where anything else can be used, and generally to the best advantage. Dr. Collins spoke of men going to extremes. We need these men to keep us from standing still.

Digests.

A POSITIVE ANCHORAGE FOR ALLOY FILLINGS, AND THE USE OF THE MATRIX. By Dr. Will S. Payson, Castine, Me. One of the most important parts of a filling is its anchorage, for without it the filling will not stay in place. This anchorage should be obtained in such a way as to conserve the strength of the tooth to its maximum, and this may easily be done in badly decayed teeth by using a double-headed gold-plated wire. Dr. West of Missouri suggested using the double-headed pins from porcelain teeth which were illustrated in the *Cosmos* in 1888. This gave me the idea, but the platinum pins are not practical, for they are too large for most cases, are not usually of the right length, and are expensive, especially when something else is better. I use double-headed rivets made from gold-plated brass wire, about No. 23 or a trifle smaller, that can be obtained at jewelers' supply houses. In fillings that will have great stress on the anchorage, I use wire No. 21 for the rivets, but No. 23 is large enough for ninety per cent of all fillings. These should be kept made up in assorted lengths.

Special Pliers for Making Rivets. To make these handily one should take a cheap pair of 5-inch pliers and file the points tapering so they will be less than one-sixteenth of an inch at the points, as we frequenly need rivets as short as that, and bevel the inside edges (Fig.) 1, which gives a better head. The coil of wire has one end headed in the vise with a very light hammer, then the wire is grasped in the pliers close to the head, the wire cut off and the other head made on the pliers. If the wire is grasped near the joint the rivet will be a long one and if near the points a short one.

Use of Rivets for Retaining Fillings. Fillings in bicuspids having an extensive approximal cavity can be securely anchored by cutting to the end of the occlusal fissure, enlarging the end linguo-buccally a little, and letting one end of the rivet rest in it and the other end in the main part of the filling. The fissure should be cut only enough to let the rivet rest in it, with a very small space around it for the amalgam (Fig. 2). The rivet will hold the filling with a good seat gingivally, and the more

sound tooth structure left here the better. No grooving should be done in the sides of the cavity for the sake of anchorage, as this weakens the tooth.

Bicuspids with extensive cavities on both approximal sides may have fillings anchored with rivets extending from one to the other, but do not cut the occlusal fissure any deeper or wider than necessary to remove the decay, for we need this part of the tooth structure to support the buccal and lingual walls. This fissure need be but a little larger than the rivet, though of course the rivet should be completely covered when the filling is dressed to shape (Fig. 3). In the same manner the rivet can be used in molar fillings; also in extensive cavities in the distal side of worn-down cuspids, where it is so hard to retain fillings.

A bicuspid having a filling on an approximal side with a rivet

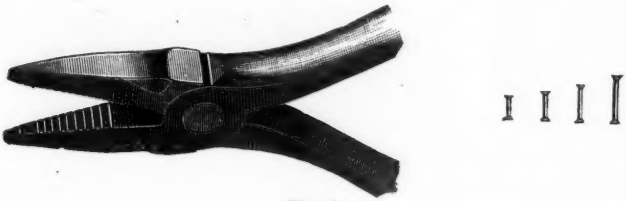


Fig. 1.

in the occlusal fissure, which later has a cavity form on the other approximal side, can be repaired by first putting a wedge against the old filling, drilling out the rivet, and putting in a new one with one head in the old filling and the other head in the new filling, thus positively holding both fillings.

Sometimes we can build down most of the crown of a molar having the pulp alive by forming a groove in the direction of the tooth's axis on the buccal and one on the lingual side, and bending a wire like a double-pointed tack with a head at either end placed in these grooves. Of course the end of these grooves should be enlarged so that the headed staple can be firmly bedded, and the staple should be so shaped that it will be completely covered by the filling (Fig. 4). If a lower molar place one groove over the mesial root and one over the distal, for this does not weaken the crown as it would to make these grooves down toward the bifurcation. If the occlusion is so close in the center of the tooth that a

staple cannot be used, a double-headed rivet can be used on either side of these grooves.

Line all cavities that are at all extensive with oxyphosphate to protect the pulp from thermal shocks and to keep the amalgam from showing through, and do this before putting on the matrix, thus having a good chance to shape the cement. The large majority of approximal amalgam fillings in extensive cavities are made flat with no attempt at contour, because if brought out to the original tooth shape the filling would become dislodged with the ordinary method of anchorage. We all know, whether we practice it or not, that it is essential to have fillings replace the lost shape of the tooth, not only to preserve the tooth itself but to protect the interproximal gum tissue which is so important.

USE OF MATRICES.—The only way to be sure of obtaining this

Fig. 2.

Fig. 3.

Fig. 4.

contour is to use the matrix. This not only gives the contour but affords a chance to pack the filling close to the cavity walls without its sliding away, and makes the finishing easier. I use matrices made of thin steel strips sold by the S. S. White Co. They come five strips in a box, and from them I make smaller strips of different lengths and widths. Punch a hole in either end, grind the edges of holes and edges of matrix so they will not cut the ligature, hold the matrix with a pair of foil carriers in each hand over a flame, curve about as it would lie around the tooth, and when cool it stays curved. These can be used over and over, and as soon as taken from the tooth, pass through a flame to sterilize. I seldom employ anything to hold them in place except a ligature and a very narrow wooden wedge at the extreme gingival edge. If a wide wedge is used it flattens the matrix too much toward the occlusal part and spoils the contour.

Dr. Clapp, in the American Text Book of Dentistry, gives a way to start the ligature with the matrix, which is to pass the

end through the hole from the inside, then around the matrix and through the other hole, then tie around the tooth. This is all right if there is plenty of space for both string and matrix pushed in together, but a better way is to tie the end of the matrix that will come on the lingual side at the middle of the ligature, pass one end of the thread through the other end of the matrix, then slip matrix in place with two parts of the string around the opposite side of tooth and tie. Then put the narrow wedge at the extreme gum edge and carry the ligature about tooth and matrix several times, tying a surgeon's knot each time (Fig. 5). If cavities are on both sides of the tooth, put the matrix nearly around it with the ends on the buccal side, and put the wedge or wedges in from the lingual side. If the ends of the matrix cut the thread, use a piece of copper wire such as Dr. Angle uses

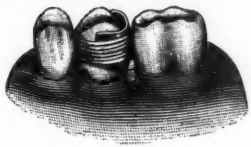


Fig. 5.

for regulating, and outside of this, if needed, use the silk. The ligature should be of the coarsest waxed floss silk.

In placing the matrix around a badly decayed tooth the patient can sometimes help us keep it in place by closing the opposite tooth against it while we tie the knot. Sometimes where a molar is badly decayed on both sides it is better to use two short matrices with an end of each tied together, instead of one long one, as the two tied fit the tooth better. After the matrix is in place, look at the margins of the cavity and see if they are all right; if not, make them so. This is another advantage of the matrix, as margins show to better advantage when it is in place.

Then select a rivet of the proper length and fill cavity with a quick-setting amalgam to a little above the groove for the rivet; then scoop out the soft filling, place the rivet and pack more amalgam over this and finish (Figs. 2 and 3). If Fellowship or Twentieth Century Alloy is used the matrix, if made of this thin steel, can be carefully removed in five minutes after the filling is

put in, and the filling finished in a very short time.—*Items of Interest.*

PORCELAIN JACKET CROWNS. By Jules J. Sarrazin, D.D.S., New Orleans. Read before the Louisiana Chapter of the Interstate Dental Fraternity, May 19, 1905. Very little of the technique described in this paper is original, but what there is may be of some usefulness. A porcelain jacket crown seems at first sight to offer dangers which remind one of those encountered between "the devil and the deep blue sea." Ordinarily, a platinum cap will result either in labio-gingival porcelain being too thin to be safe or allow good shading, or an all-porcelain jacket with no metal cap will invite lingual fracture on account of a thin porcelain layer being offered to the impact of lower incisal edges. With little originality the method described borrows what appears to be the best points of both preceding systems, giving a strong labio-gingival porcelain wall, the color of which is produced by a facing, while lower incisal occlusion is borne by either platinum alone or by thick porcelain, and the pins of the facing are reliably soldered to the platinum cap instead of depending on porcelain adhesion to retain it.

We will preferably take an unfavorable case for illustration, one in which a large pulp has to be both avoided and protected, Figs. 1 and 2. Trim the natural crowns to dotted lines in Figs. 1 and 2. Remove all cervical enamel. Make a No. 30 gauge copper tube, Fig. 3, a little longer than the stump and with a tight cervical fit. Instead of cutting a shoulder all around the gingival lines of the stump, as would be done in porcelain jacket work without a metal base, cut a well-defined one in the gingivo-labial cervix, only 1-40 inch beyond the gum's free margin. Fig. 4.

All the stump trimming is made painless by the dentinal tubuli pressure-anesthesia process, and the stump is cauterized with silver nitrate as soon as its trimming is completed, preventing chemical and thermal irritation then and later. After that final crown mounting will be done with gutta-percha, and the protection and preservation of pulp life are assured.

The copper tube, Fig. 3, now comes into play. It was made before cutting a labio-gingival shoulder (Fig. 4, dotted lines), to obtain a tight cervical fit. Now with the copper tube full of

soft plaster or modeling compound, and with the thumb compressing it, take an impression of the stump. A snugly fitting platinum cap, No. 32 gauge, will now be made. It may be either burnished in carefully divided flaps to an amalgam stump made from the modeling compound impression, and the flaps gold-platinum soldered afterward, or it may be swaged to a fusible metal die made from the plaster impression. Try in the mouth and secure perfect adjustment. Reinforce the cap lingually (dotted line at C, Fig. 6) to offer wearing material against the

Fig. 1.

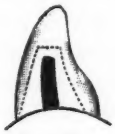


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

shearing action of lower incisal edges. No. 30 platinum plate, gold-platinum soldered, will usually be found quite sufficient, and the inevitable grinding will have made space for its correct burnishing, or swaging and soldering. In case we are making a crown, a basal ridge is usually a necessity for perfect occlusion, or in the case of a bridge, to join abutments with other dummy supports. A half-round iridio-platinum wire, about No. 13 gauge, will be used (b, Fig. 6), always sparingly gold-platinum soldered.

Fig. 5 illustrates the fact that by cutting the labio-gingival shoulder, as above explained, there will be room cervically for a

thin facing being ground to the platinum cap, giving certainty of coloring and of porcelain not peeling off anywhere, obviating this danger where it is greatest, namely, at the gingival line. The pins of facing are bent and gold-platinum soldered (dotted lines, d, Fig. 6), giving the porcelain strong, reliable attachment, while not weakening it. The No. 30 gauge platinum reinforcement at C, Fig. 6, has been extended, as illustrated, beyond the morsal end of the platinum cap, to form a short sustaining shoulder to receive the porcelain, and at the same time to further protect it against normal lower incisal strain.

The relations between porcelain and the platinum cap are illustrated in Fig. 6, where A shows the overlap of the metal cap by the porcelain. It will be noticed at a glance that the construction sacrifices strength in neither, while offering the greatest possible degree of functional resistance to both normal use and abuse.

This system will tend to bring the labial faces of porcelain crowns a trifle more labially than those of the natural teeth which they replace, but the difference is so slight as to be neither noticeable nor important in normal cases, amounting to no more than a 1-40 of an inch and frequently less.

This description, as will have been inferred, applies to upper anterior teeth, but is in no wise limited thereto. Individual ingenuity will suggest the slight departures which may be necessary elsewhere, say for bicuspids, while in the case of lower incisors the absence of lingual occlusion and conditions of single crowns or bridging will of themselves suggest the necessary variations to the prosthodontist.—*Items of Interest.*

HYPNOTICS AND ANODYNES; THEIR DENTAL APPLICATIONS. By T. L. Grisamore, Ph.G., D. D. S., Chicago. Read before the Chicago Dental Society. As the laity become convinced of the fact that our profession is a profession, and acknowledge it as such, so should we be able to strengthen their belief along that line by prescribing intelligently medicines for their ailments, when we are called upon to administer to them professionally. I do not know of any one thing which strengthens the dentist in the minds of his patients more than to be able to

prescribe when the case demands, and to do it in a manner which indicates that he is familiar with the needs of the individual and thoroughly acquainted with the remedies he is using.

He should know pharmacology; he should know the dose, medium, full and toxic, and what to expect after the administration of each. If toxic effect comes from the administration of a medium dose, as does occur in many individuals, he should be able to recognize it and administer antidotes, both physiologic and chemical, without delay. To my mind, no man should ever administer any drug without a knowledge of at least the greater part there is to know of its physiologic action. Hallis says: "Drug proving is the only true basis of drug using," and should we as dentists follow that motto in all our work, it would not be long before the suggestions of our being a branch of the medical profession would be considered as a huge joke instead of a stern reality.

Another of the important features is to know the condition of the individual to whom the remedy is being administered. I think all will agree with me in this, if you consider only the cases of poisoning wherein some recover while others do not, and this does not include the vast number of drug fiends who never recover from the use of what are commonly known and thought of by the laity as harmless headache or neuralgia powders. This is simply an example of administering hypnotics and anodynes without a knowledge of the conditions involved. In administering this class of drugs we should write the prescription or give the remedy with strict directions as to the manner in which it shall be administered, and in my opinion without the individual in most cases knowing the ingredients of the remedy, as by so doing he can reduce to the minimum the liability to the habitual use of the drug.

Since the drugs generally administered internally by the dental practitioner are those having the most powerful anodyne and hypnotic properties, I will here discuss a few of the more important of this class. For convenience, I will divide this general class into three sub-classes, namely, alkaloidal, hydrocarbon, and the coal-tar derivatives.

Alkaloidal.—Alkaloids are the basic properties found in plants and belong either to the amines (compounds containing carbon, hydrogen and nitrogen) or amides (compounds containing carbon, hydrogen, nitrogen and oxygen). The amines are liquids and

volatile, while the amides are solids and almost non-volatile. Most alkaloids have certain properties in common, such as alkaline reaction, bitter taste and decided physiologic action, they are soluble in chloroform, ether and alcohol, but very sparingly soluble in water. When these simple alkaloids are acted upon by acids there are salts formed which are named like other salts of these acids, such as hydrochlorate, sulphate, acetate, etc. These salts possess just the opposite soluble properties to the simple alkaloids, i. e., they are sparingly soluble in chloroform and ether, more freely soluble in alcohol, and freely soluble in water.

While this sub-class contains a number I will dwell only upon one, and that is morphin, which I consider the most important of all hypnotics and anodynes, also the most used, as well as the most abused. Morphin is the principal alkaloid of opium, obtained from the milky exudate of the unripe capsule of the poppy. This alkaloid itself is seldom administered, and when the effect of the drug is desired it is prescribed in the form of a salt, either the hydrochlorate or sulphate. These salts, being soluble, neutral and non-irritating, are desirable preparations for use, and are commonly found in commerce, both in bulk and tablet form. Morphin is a drug used against conditions and not against disease, since it contains no curative properties, and the condition for which its action is specific, also the condition which to a great extent governs the dosage, *is pain.* Its decided action in this respect makes it one of the most useful systemic drugs in the pharmacopeia with which the dental practitioner has to deal. If immediate effect be desired the drug should be administered hypodermically in ⅓ to ¼ grain doses, in combination with 1-120 grain of atropin. The size of the dose depends upon conditions, such as intensity of pain, etc., as pain seems to be a direct antagonist to morphin.

The cases in which we as dentists are called upon to administer this drug most frequently are those of severe pain resulting from facial neuralgia, acute alveolar abscess, etc., which we cannot relieve by any local means. In these I have for some time used with very pleasing results, in combination with morphin, antimony and potassium tartrate, for its diaphoretic effect, and strychnia sulphate as a physiologic antagonist.

The following formula may be used:

℞	Morphinae Sulphatis,	grs. i
	Antimonii et Potassii Tartratis,	grs. ¾
	Strychninae Sulphatis,	grs. 1-10
	Sacchari Lacti,	grs. xxx

M. Ft. Pulveris, No. 8.

Sig: One powder every half hour (½) until relieved or until four have been taken.

One point to be constantly guarded against is to give this drug in such a manner as to prevent the individual becoming addicted to its habitual use. This can best be done by dispensing it yourself, or if a prescription be given there should always be written: Do not refill.

Morphin should rarely, if ever, be administered to children, and if given the dose should be much less than the rule would indicate, and then in combination with some other drug. Morphin should not be administered to nursing mothers, as a certain amount is secreted through the mammary glands, and may produce morphinism in the suckling; neither should it be given to individuals suffering from chronic nephritis or pulmonary affections associated with embarrassed respiration.

Hydrocarbons.—Most of the members of this sub-class have hypnotic and anodyne properties, but a great many of them possess other properties which bar their use for this purpose. Of those indicated for these properties the oldest, most used, and one of the most valuable is chloral hydrate. This is prepared by the action of dry chlorin upon absolute alcohol, and appears in commerce in the shape of colorless, transparent crystals, having a bitter taste, pungent odor, and neutral reaction. It is depressant to the cerebral, medullary and spinal centers, also to the muscles of the heart. In medicinal doses it acts upon the brain cells, lowering only the mental activity, and in this way producing sleep which resembles the natural, and is not followed by headache, depression, and other uncomfortable symptoms, which usually follow the administration of morphin. It is borne well by children, and is an excellent remedy for infantile convulsions, which are common occurrences during dentition. In conjunction with the bromid of

sodium it is probably the best remedy at our command for this purpose. This is a convenient formula:

℞ Chloralis Hydratis, grs. xxx
Sodii Bromidi, grs. xvi
Aquae Cinnamoni, q s ad ʒ ij

M. Sig.: ʒ doses as indicated, for child of two years.

Although inferior to morphin for the relief of pain, chloral is a very useful substitute in cases in which the pain is of moderate intensity, or when an idiosyncrasy exists for the former. These two drugs may be administered in one solution to good advantage, as one seems to aid the action of the other. A combination of this sort acts with pleasing results when given to nervous patients a short time before a dental operation. I find the following proportions most desirable:

℞ Chloralis Hydratis, grs. v
Morphinae Sulphitis, grs. ⅛
Aquae Cinnamoni, ʒ i

M. Sig.: Give in one dose.

Butyl-Chloral Hydrate.—This drug is prepared by passing chlorin gas into acetic aldehyd. It comes in commerce in thin white scales of silky luster, peculiar odor, bitter taste and neutral reaction. It is used as a substitute for chloral hydrate in cases of heart disease, and where very large doses are required for hypnotic effect. It has practically no narcotic action, which makes it a desirable drug for administration where hypnotic effect only is desired. Its dominant action, however, is upon the fifth nerve, this fact making it of vast importance to the dental practitioner.

The following formula is a convenient mode of administration:

℞ Butyl-chloralis Hydratis, ʒii
Alcoholis,
Aquae Cinnamoni, aa. ʒi

M. Sig.: One ʒ every half hour until the desired effect, or until five doses have been taken.

Coal-Tar Derivatives.—This sub-class was discovered by chemists and pharmacologists in an endeavor to find a cheap substitute for quinin. Although the search did not bring about the desired end, it brought to light a number of very valuable substances, some even of more value than the alkaloid sought.

These substances contain a number of actions in common, such

as antipyretic action upon the heat center, often associated with free perspiration, which is of advantage in many cases where the dentist is called upon to administer this class of drugs; the formation of methemoglobin, and the action in which we as dentists are most interested, that upon the central nervous system. This action is as yet very poorly understood, but that it does exist has been proved by the relief given when administered to individuals suffering from such nervous disorders as neuralgia, headache, etc., without affecting the movements or consciousness. The members of this sub-class most universally used for their hypnotic and anodyne properties are:

Acetanilid.—Prepared by the action of glacial acetic acid upon anilin, a white shining crystalline powder, odorless, of a burning taste, sparingly soluble in water, but freely soluble in alcohol.

Phenacetin.—Prepared by the action of glacial acetic acid upon an anilin derivative. It occurs in crystalline scale, colorless, odorless, tasteless, sparingly soluble in water, but more freely soluble in alcohol.

Antipyrin.—This is a synthetic compound made and put on the market by a monopoly. Its contents are not known, but it is now generally conceded to be formed by the action of diacetic ether upon an anilin derivative. It occurs in colorless, odorless, scaly crystals, with bitter taste, and unlike the other two, it is freely soluble in water.

These drugs may be used with good results in combination with sodium bicarbonate and caffein citrate, a desirable formula being:

℞	Acetanilidi,	grs. xviii
	Sodii Bicarbonatis,	grs. xx
	Caffeinæ Citratis,	grs. viii

M. Ft.: Pulveris, No. 6.

Sig: Take one powder every hour until relieved, or until four have been taken.

If immediate effect be desired, or you want a more powerful anodyne than acetanilid, and morphin is contraindicated, a very useful remedy may be had by adding to this formula two grains of codein, which is an alkaloid of opium, but much less toxic than morphin.

These preparations should be given with utmost care to individuals affected with tuberculosis or other adynamic diseases.

When administering to children we should give a much smaller dose than the rule would indicate, since there are many fatalities on record from the administration of these drugs to children; neither should they be administered to nursing women, since they have been frequently detected in the lacteal secretion. We should also remember that idiosyncrasies are not uncommon, and always begin with smallest dose and gradually increase until the desired effect, unless that would require more than xxx grains of acetanilid, which is the most toxic, or $1\bar{5}$ of antipyrin or phenacetin in twenty-four hours, which amount should never be exceeded.

In conclusion, allow me to repeat, if we as a profession desire to continue onward and upward in the future as we have in the past, to occupy the place we deserve among the learned professions, and to continue advancing in the minds of the public, one of the channels open for advancement is the study and administration of drugs for their systemic as well as their local effect.

Discussion.—*Dr. Elgin MaWhinney:* The paper presents some very excellent thoughts, particularly the combinations of drugs suggested, although I do not see much advantage in combining morphin and tartar emetic rather than combining opium with ipecac in the form of Dover's powder. I like the diaphoretic effect of the latter better than I do the former, and it is not so harsh on the digestive tract.

I think the need for anodynes is growing less each year as the public appreciate the value of their teeth more and more, and there is less suffering in consequence. However, there is a large number of people who consult the dentist only for the relief of pain, and some who consult him for the relief of pain when it is not due to any neglect on their part. Many cases of incipient alveolar abscess are such that the pain cannot be relieved readily by local treatment, and it becomes necessary to administer some of these agents. There is another place where the hypnotics and anodynes are indicated, not so much for the relief of pain per se, but for the purpose of preventing it by fortifying patients to undergo a serious operation. That is the time when we can very happily make use of the suggestions contained in the paper.

I have always felt that the dentist makes a very serious error when he wilfully forces his patients into such a degree of suffering that they lose confidence in dental operations. Many would rather

let their teeth decay than undergo such severe pain, or they will have them extracted and resort to artificial teeth. Many people allow their teeth to go unattended because they dread the pain incident to dental operations. Many times, in very nervous persons and those who suffer greatly even from small causes, we must resort to hypnotics and anodynes if we perform our operations thoroughly.

In later years I have not used morphin so much as a fortifier against pain as I have the coal-tar derivatives, and the combination containing acetanilid suggested by Dr. Grisamore strikes me as a very good one. I have used phenacetin as well as acetanilid with good results.

The essayist did not suggest the value of always giving a good cathartic following the use of any of the opiates. They disturb the whole digestive tract more or less. In giving morphin I like the plan of impressing the system with one dose, rather than giving small doses repeatedly, but I prefer the opposite with the coal-tar derivatives, giving small doses repeatedly rather than one large dose.

Dr. J. P. Buckley: There is one thing in connection with this subject that ought to be emphasized, and that is the study of pathology. We cannot give drugs internally unless we know the conditions, and we should not be too anxious to use hypnotics or anodynes without studying the underlying conditions. Dr. Grisamore referred to neuralgia. Neuralgia is not a disease; it is a manifestation of a disease, and we must look beyond the manifestation to other pathological conditions. If the neuralgia is the result of anemia we should not give morphin, as the patient must take something that will build up the system. We can give him an elixir of iron, quinin and strychnin, or some systemic tonic, and build up his system. If the neuralgia is of syphilitic origin it is our business to find out the trouble and have the patient take potassium iodid. If the neuralgia is due to a rheumatic or gouty diathesis we give medicines to correct this condition. If the neuralgia is of malarial origin then give quinin.

I want to congratulate the essayist in bringing this subject to our notice, and desire to emphasize two drugs particularly. If you want to produce sleep, give chloral hydrate or butyl chloral hydrate; if you want to stop pain, give morphin.

Dr. MaWhinney spoke of fortifying the patient. The drug that is especially indicated when the nervousness of the patient comes from fear or dread is potassium bromid, masking its taste with some elixir or syrup, as simple elixir or compound syrup of sarsaparilla.

A CONSIDERATION OF THE CONDITIONS POINTING TO GRAVE RESULTS IN AND THE CAUSES OF DEATH FROM ALVEOLAR ABSCESS. By G. V. Black, D.D.S., Chicago. Read before the Northern Iowa Dental Society, September, 1905. It may be said in the beginning that death from alveolar abscess is comparatively rare. Yet cases having a fatal termination are sufficiently frequent to lead us to inquire into the conditions most likely to lead to a fatal result. In doing this, however, it is perhaps just as important to point out the conditions often present in the early stages of this malady that threaten serious results, such as necrosis of the maxillary bones and grave septicemia.

Every case of alveolar abscess begins with an inflammation of the apical portion of the peridental membrane following immediately or more or less remotely the death of the pulp of a tooth. If acute there is severe pain and soreness of the tooth. In most cases this is accompanied by a lymphangitis in which the lymphatic glands of the floor of the mouth, the submaxillary lymph glands and those of the angles of the neck are more or less involved. Generally pus forms about the apex of the tooth promptly and more or less absorption of bone in the immediate neighborhood takes place quickly. During this process a sharp rise of temperature occurs, often preceded in the severer cases by a chill. The severity of these symptoms gives indications of the probable vile results that are to follow. It is well at this time, if the symptoms are severe, to look carefully to the general condition of the patient, particularly to see that the circulation is good and that the alimentary tract is in good condition. When there is considerable severity the bowels should be cleared with saline cathartic or some form of catharsis which gives large, watery stools. A fever of more than 103 degrees betokens danger in some direction and 105 degrees or 106 degrees becomes in itself dangerous unless its duration be very short.

In much the greater number of instances alveolar abscess, though for the time very painful, is very simple. Pus forms promptly, bur-

rows to the surface of the bone through enlargement of some Haversian canal, and is discharged into the soft tissue, usually on the labial or buccal side of the tooth affected. Then it forms a rounded swelling in the sub-mucous tissue and within a few days finds its way to the surface and the pus is discharged. Then the symptoms quickly disappear and the abscess assumes the chronic form and may remain in that condition for many years, giving very little trouble.

Occasionally such an abscess is chronic from the first and may run its whole course so quietly as not to attract the attention of the patient. Every gradation from this to an inflammatory movement that, together with the accompanying fever, actually threatens the life of the patient, or even destroys life, have been observed. In a good many cases I have observed a temperature of 105 degrees and in a few 106 degrees and over, accompanied with enormous swelling involving a whole side of the face below the eye and including the eyelids and angles of the neck.

These appearances and their variety from this cause are so familiar to members of the dental profession that it seems unnecessary to describe them further. The rule is that, though the symptoms may be severe and entail acute suffering for the time, the whole disappears promptly with the discharge of the pus, and such cases are not regarded as in anywise dangerous to life, or even to the tissues involved.

In this normal course of alveolar abscess, with the ordinary infection producing it, the only real danger to life is from the extraordinary rise of temperature that occasionally accompanies it. I think this danger could never occur if the pus were promptly and thoroughly removed.

In the course of these abscesses there are certain conditions frequently present that give opportunity for serious results, especially necrosis of bone and the prolonging of the condition of active suppuration. The most common of these is the formation of a pus cavity between the bone and its periosteum immediately the pus reaches the surface of the bone. If this happens to occur at a favorable point for wide spreading, i. e., where there is a considerable space of bone surface without muscular attachments, the periosteum is easily lifted over the whole of the space. If coupled with this the inflammation is severe, the fever high and

the formation of pus profuse, the conditions point to wide necrosis of the part of the bone that has been deprived of its periosteal covering. It is in this class of cases that most of the ugly necrosis cases occur in alveolar abscess. Also from the limited histories I have had of death from alveolar abscess I must conclude that these have always been from this class of cases.

Such cases may be diagnosed from the following signs early in their progress: First, when the pus, after passing to the surface of the bone, forms a rounded tumor with definite outlines easily found by digital examination, the case is a simple one, though the symptoms may be severe. If the pus is not promptly discharged with the knife, as it always should be, it will soon find its own way to the surface, be discharged, and little harm is done.

If, on the other hand, the pus, after passing through the bone, spreads between the bone and the periosteum, there will be presented a soft, flabby swelling without definite margins, easily found by the fingers. In this form if an examination is made with the probe after the discharge of the pus, the bone will be found denuded of periosteum over a considerable surface. This is the most dangerous form of alveolar abscess. Wherever there is serious damage by necrosis of bone, prolongation of suppuration, or imminent danger to life quickly occurs, it is from this form of the abscess as the rule.

The particular location of the tooth is not important. The grave results arise from the pointing of the pus in such a way as to begin spreading between the bone and its periosteum. In this case the pus will spread to the limits of easily raised periosteum and often will quickly travel considerable distances. For safety such cases require immediate radical treatment by drainage as soon as they are discovered. The pus should be discharged by a free incision, the pus cavity well washed with a mild antiseptic solution, and then a sufficiently large tent of plain antiseptic gauze, or of cotton, should be placed well into the opening to insure full and complete drainage. This tent should be prepared by being dipped in 95 per cent carbolic acid and then dried out as thoroughly as possible by squeezing between thick folds of a towel, or a sufficient amount of absorbent cotton.

There is no place in the human body where this matter of care in securing beyond question the complete drainage of abscesses is so

important as in the mucous tissues of the mouth. The reason for this is found in the fact that the blood supply is so rich in this region that cuts close in a surprisingly short time and the formation of pus is often profuse and rapid. I have seen a cut three-fourths of an inch long through which a large quantity of pus had been discharged glued together so strongly within six hours that a new incision had to be made. The cut had been fully sufficient for the purpose of drainage, but it did not remain open a sufficient length of time to accomplish the purpose.

Here we must insist upon the necessity of keeping up the drainage for a sufficient time for the complete cleansing of the abscess. One that is discharged early while the act of primary pus formation is in active progress is not often sufficiently drained by being once fully emptied of its contents. The process of pus formation is in active progress in the walls of the abscess cavity and more pus is sure to form and require removal. This is especially true when one wall of the pus cavity is bone deprived of its periosteal covering. It is largely for this reason that I insist on the use of 95 per cent carbolic acid in the tent first used in these cases, indeed all cases of the drainage of abscesses in the membranes of the mouth. A very small amount of carbolic acid retained in the gauze or cotton is sufficient to cauterize the lips of the incision without injury to surrounding tissue, makes the opening freer than it would otherwise be, promotes the egress of pus and at the same time presents more of a barrier to the ingress of new infective material.

The rule is that the most severe characters of alveolar abscess treated in this way abate promptly. The swelling and the pain disappear, necrosis of bone does not occur, and the patient feels well within a few days. This is said on the supposition that the case is seen and promptly treated very soon after pus has begun to form.

On the other hand, if the treatment is delayed, grave results are to be expected. Bone with its Haversian canals blocked by inflammatory deposits and deprived of its periosteal nutrition cannot be expected to retain its vitality many days. The area of bone worst situated as regards nutritive processes will die, and then the slow process of exfoliation must be awaited. During this time suppuration in a less violent form will proceed, necessitating continuous free drainage, and exposing the case to the danger of infection

in more virulent form. This much is said under the supposition that the case is one of the usual simple infections that occur in the mouth. But there are infections and infections. Infections are not all of the same variety.

Lymphangitis.—Lymphangitis is a usual accompaniment of alveolar abscess and is often quite pronounced in the lighter forms of the affection. This often appears early in its progress and is as often lost sight of in its after progress, though still an important complication. It is the direct result of the poisoning of the lymph streams by the products of inflammation or by-products of pus formation; or, in either case, by microbic poisons. It is seen most in swelling and soreness of the lymph glands just under the lower maxillary bone to the rear of the submaxillary gland and in the floor of the mouth, later anywhere about the angles of the neck. In persons of ordinary health these glands, though they become very sore and often distressing, rarely suppurate. If, however, the glands are already tuberculous, suppuration may occur as a sequel and give trouble.

Infections in Alveolar Abscess. The most usual form of pus-producing microorganism found in alveolar abscess is the common white staphylococcus frequently found in the saliva, in carious dentin and in any of the remote places about the mucous membrane. Ordinarily this is not a very virulent organism, yet sometimes it produces a very severe inflammatory movement and profuse suppuration. However, both the inflammation and the suppuration are promptly relieved by the thorough evacuation of the pus. Occasionally we find staphylococcus aureus mingled with the white and more rarely the yellow coccus has caused the original infection. In this case both the inflammation and the suppuration are likely to be more persistent and severe, but the differences are not very important. If, however, we find the streptococcus longus the case is a dangerous one. Perhaps I cannot express the difference between these two types of infection better than to say that infections of the skin known as the common boil are staphylococcus infections, while those known as the carbuncle are streptococcus infections. Also that the difference in the prevalence of these two types of abscess expresses the difference in the frequence of these types of infection. Compared with this the streptococcus longus is still less frequent in the mouth.

In making cultivations from the saliva we find the white staphylococcus often, and especially so in the softened portions of carious dentin. The yellow coccus is found less often in the mouth and the streptococcus longus very rarely. In one instance I found it free in the saliva and under the finger nails in each of four nurses who were dressing cases infected with it.

From my observation I should say that original infection with streptococcus longus is rare in alveolar abscess, yet it occurs occasionally and makes ugly business.

Infection with microorganisms that induce edema occurs frequently both in connection with alveolar abscess and without. It seems to be much less important when connected with abscess than when standing alone for the reason that the serum more readily escapes from the tissues. The characteristics when alone are broad local swellings without suppuration and accompanied by considerable pain from the distension of the tissue and the inflammatory movement. When standing alone I have most often seen it occur from some slight prick or puncture; but it has occurred a number of times in extraction wounds. I have met with two cases of imminent danger of death from suffocation from the edematous swelling of the glottis and associate parts, primarily caused by infections occurring in the mouth. One of these was from infection following the extraction of a tooth, and the other from the prick of an instrument in the floor of the mouth.

In the extraction case I was called forty-eight hours after the swelling began. The swelling of the face and throat was enormous. The patient was struggling for breath and cyanosis was very pronounced, the lips and mucous membranes appearing distinctly bluish. A brisk saline cathartic had been given by the physician and to assist more directly in removing the accumulation of serum I pushed my knife through the tissues in various directions and placed the feet in hot water. In the other case the danger to life was not so imminent, but the swelling of the floor of the mouth was so great that the raphe under the tongue upon which the submaxillary and sublingual glands open was protruded over the lower teeth. The mouth could not be closed and there was much difficulty in breathing. This was treated similarly to the other case and with good results. In both these cases I made very free use of the knife purely for the purpose of giving opportunity for the escape

of serum. Such cases are liable to be confounded with alveolar abscess.

Reinfections.—In the management of acute alveolar abscess it should be remembered that reinfection with more virulent micro-organisms may occur at any time and that the same care as to infection should be taken as in treating an aseptic wound. It is a much too common error to disregard antiseptic precautions in treating suppurations. It is very certain that many of these cases do badly because of this neglect, in other words, because they have been reinfected with other and more virulent organisms during the treatment.

It is well known, of course, that absolutely aseptic work cannot be done in the treatment of abscesses that open upon the mucous membranes of the mouth, but the nearest practicable approach to it should always be adopted.

Extensions of Alveolar Abscess in unusual directions hardly need consideration in this connection. In the acute forms such extensions are rarely a principal source of danger, but a neglected burrowing may suddenly become a danger point. Recently such a case came to my notice. An ordinary acute abscess at the apex of the root of a central incisor was treated by removing considerable pus through the root canal. The soreness of the tooth subsided promptly but a little swelling remained high up on that side of the face. Four days later there was enormous swelling of the face and eyelids, but no soreness of the tooth. On examination I found a broad pus pocket lying between the periosteum and bone covering the region below the eye which I readily reached with an incision under the upper lip. In this case I suppose a little pus had passed under the periosteum between the attachment of the labial muscles into the space bounded by the attachment of the several muscles moving the upper lip, wing of the nose and the infra-orbital foramen and had been cut off when the pus had been discharged from the alveolar abscess proper. In this way a secondary deep-lying and dangerous abscess had been formed. The lower eyelid and the skin below it were a deep purple and the anterior wall of the antrum of Highmore was in imminent danger of necrosis.

Death from Alveolar Abscess when not caused directly from extraordinarily high temperature is due to septicemia. Septicemia is the direct result of poisoning of the general system by products absorbed from the area of suppuration.

This is one of the conditions so often termed blood-poisoning. The other conditions included under this term are lymphangitis (inflammation of the lymph tracts and glands) and pyemia (literally, "pus in the blood"), but in use is generally confined to a condition in which abscesses occur one after another at different points because of microbic poisoning: Metastatic abscesses. In pyemia the fever runs a very irregular course and is frequently interrupted by chills.

It includes also sapremia, a condition supposed to be due to the absorption of poisonous products of decompositions, not of parasitic organisms in the tissues, but by saprophytic organisms in stagnant accumulations of pus which become putrid; this has also been termed putrid fever. Many such terms originated before the real connection of microorganisms with these ailments was known; and in the fitting of them to the new causes of disease found there has been much confusion. They are not infrequently used interchangeably. However, the differences between the conditions described as lymphangitis, septicemia and pyemia are sufficiently marked. Lymphangitis is generally an accompaniment of the other two conditions but may exist alone. The rapid increase of the proportion of white blood corpuscles as compared with the red blood corpuscles in the blood is a common characteristic in all of these conditions; indeed, it is a common characteristic of suppuration in all of its forms. For this reason the count of blood globules, white and red, in definite amounts of blood, has become an important index to the patient's condition.

In septicemia the character of the infection which has induced the suppuration has the same importance as that which divides the ordinary boil from the carbuncle. The differences in the danger to life are similar and also there are similar differences in the symptomatology.

Septicemia often occurs in grave form from staphylococcus infections but is usually slower in its development. In either case grave septicemia occasionally occurs quickly. Death has been reported within four days. More generally, however, very grave conditions do not occur within less time than a week or ten days of violent suppuration.

Septicemia is characterized by a continuous fever varying in degree morning and evening and presenting features somewhat

similar to typhoid fever. There is apt to be headache, listlessness, disturbance of the alimentary tract, often with diarrhea, followed by an indifference to pain and to surroundings that is characteristic. As the condition becomes more grave the skin is liable to assume a leaden hue and often there is a yellowish hue, or bronzing. In very grave cases the indifference to pain and to surroundings becomes more and more marked. The pulse becomes very frequent and the action of the heart feeble.

In the treatment of this condition there are several points of importance. The condition of the point of suppuration is first to be considered. The treatment must be directed to the stoppage of the absorption of poisons from the abscess. This should be emptied of pus as completely as possible and very thoroughly washed with a mild antiseptic solution. This washing, or irrigation, should be frequently repeated so that the suppurating surfaces may be kept as clean as possible. The utmost limitation of the suppuration should be brought about for the reason that it is this that is producing the general symptoms. This should be done with the least disturbance and worry of the parts, and to the patient, practicable, but thoroughness should in no case be limited.

The general treatment should have two principal objects that at first sight would seem to be somewhat antagonistic—the promotion of elimination of the poison absorbed and the support of the patient. The first is best done by cathartics that induce large watery stools, the second by alcoholic stimulation and good feeding. Often there will be distressing diarrhea which in the first instance is best combated by cleaning the alimentary tract. This may be followed by stimulants and as much nourishing food given at frequent intervals as can be properly taken care of. If the pulse is very frequent and weak the heart should be supported carefully with digitalis given first in small doses and increased according to indications. If diarrhea becomes too profuse it may be carefully limited with opium, but not to the prevention of a fair degree of elimination. The use of antipyretics has not given good results in this condition and especially the coal tar products are to be avoided. They do not seem to add materially to the patient's comfort, while the brief lowering of the temperature obscures the real condition. They are also likely to produce a depressant effect, which in this condition should be especially avoided. On the other hand alcoholic stimula-

tion is well borne and many authors recommend its free use. The claim is made that the free use of alcohol has a restraining effect upon the growth of microorganisms, i. e., acts as an antiseptic and is beneficial in that way in addition to its stimulating effect. To me it seems that an amount of alcohol sufficient to have a marked effect in this direction would be dangerous to the patient. I notice a report in Warren's Surgical Pathology (page 355) of the administration of a quart of alcohol per day in this condition without bad effects. Such an amount would seem to me very dangerous. Any flushing of the face should be a sign for diminishing the dose.

After all it must be remembered that the radical cleaning of the abscess and the use of antiseptics locally to diminish, and if possible to stop the formation of pus, is the radical curative treatment.

Reports of cases of death from alveolar abscess have been singularly lacking in the particulars as to the conditions and steps of progress of the disease. In the main, however, the general conditions seem not to differ materially from the conditions reported by surgeons in septicemia from infected accident and operative wounds. In my own practice no deaths have occurred directly from acute alveolar abscess, though in several instances escape has been by a narrow margin.

The following case shows well what may happen, though the case was not alveolar abscess it was very similar. For a young lady I had removed an exostosis occupying the region of the lower jaw from the second molar to the first bicuspid, including these teeth. After ten days the patient went home under the care of the family physician with the wound doing well, but with a deep cavity granulating nicely, but not nearly closed. Two weeks later she appeared at my office without warning in a most distressing condition. She presented the same sort of insane condition so often seen in typhoid fever, only that it was accompanied by great mental distress. Her face and neck were badly swollen and it was quickly observed that pus had burrowed from the wound far down the side of the neck. The temperature was 103½°, pulse very frequent and weak. I soon learned that she had evaded her nurse and slipped out in the early morning, caught a train, and come to see me. She was immediately conveyed to the hospital, the most radical drainage of the infected area established and the parts thoroughly cleansed. Though ordinarily very sensitive she submitted to the

free use of the knife without an anesthetic and without special complaint. An irritative diarrhea was noticed and as quickly as possible the alimentary tract was cleaned with a saline cathartic and stimulation and supporting treatment pushed. Within forty-eight hours she was out of immediate danger, but the infection which caused the inflammation which ushered in the new suppuration had caused a considerable necrosis of bone just at a point where it could not well be spared, and this threatened to divide the mandible. Then the long period of suppuration awaiting the exfoliation of this necrosed bone had to be awaited but was passed without further serious conditions developing.

In this case the active mental derangement but with a determined purpose which could, in her case, have been more easily reached by a request, and the great mental distress apparent are not common in septicemia. Other symptoms, however, were in the usual line.

I have said that in the reports of cases of death from alveolar abscess the accounts of the symptoms and progress of the disease and conditions leading to a fatal termination have been very meager. This, however, is not the worst feature of the matter; in fact, most cases of death from alveolar abscess are not reported at all. Under these circumstances we are unable to know much about the actual frequence of death from this cause. Further than this not a few of the cases are actually obscure in official reports of death by being reported as death from "blood-poisoning," septicemia, and other captions which though correct enough as to the ultimate condition, give no idea of the original ailment or accident which was responsible for this condition.

Suppose the surgeon because of a slight prick of the finger during some operation became infected and the case is reported as death from septicemia, from pyemia or from lymphangitis, what intimation will that give statistically of the dangers of the surgeon in operating? If cases of death from infections in the dissecting room are thus reported in official records the facts of the dangers of the dissecting room are falsified in such records. In this way the official records of death from alveolar abscess are falsified and we are denied that knowledge of them which we should have. Indeed, our official records of death from similar lines of causation are so unreliable as to be without value for scientific study for the reason that the original lesion giving the opportunity for the infection is not reported.

Generally this has been because it has been regarded as too slight a thing to be reported as a cause of death. This is not right and surgeons are doing a wrong to their profession when they fail to report the original lesion in such instances.

But cases of death from alveolar abscess should be reported in our dental journals. When they cannot be reported in detail with the symptomatology and progress to a fatal termination, with the treatment employed, which of course is most desirable, the bare fact that the death occurred from this cause would be of service in reckoning the percentage of danger.

It seems evident that dentists have been unwilling to make these reports. There seems to be a feeling that they are in some way blameable for having a death from so slight a cause. Such a feeling is wrong, and is doing a wrong to the dental profession, for so long as dentists have such an idea and fail to report the facts the public will have reason to censure them for death from such a cause. Incidentally, I have known of several deaths from alveolar abscess in Chicago and the region about the city, of which there has been no report. Dentistry has lost the advantage in the treatment of these conditions that such reports would give. This is not right either from the standpoint of the dentist or the standpoint of the people whom we serve. It is a fact that deaths occur from this cause and there is a certainty that they will occur in the future. This should be recognized by both the dentists and the people whom they serve. Then the dentist will be no more blameable for the loss of life from alveolar abscess than the physician or surgeon is now for the loss of life through infection from the prick of a finger or from tetanus under like circumstances. It is our duty to report things correctly.—*Northwestern.*

SOMNOFORME. By Dr. B. H. Cooper, Boston, Massachusetts. Read before the Vermont State Dental Society, March, 1905. Before I venture to describe the use of somnoforme, it may be well to reconsider briefly the history and general characteristics of the drug itself, as I find that there are many practitioners who have heard of it in a general way, but who are pleased to wait until it has been given an American baptism of criticism and trial before they venture to investigate it on their own account.

Somnoforme was first brought to the notice of the profession

by Dr. G. Rolland, Professor of Anesthetics and Dean of the Dental School and Hospital of Bordeaux, France, at the Congress of the French Association for the Advancement of Science, in 1901.

Since then, its use has become general in England, France and Spain, where many of the larger hospitals are using it with success. There have now been in the neighborhood of two hundred thousand administrations of the gas, and not one death caused by its use.

Somnoforme is simply a compound of three well-known anesthetics, but a compound in which the undesirable features of each of its components have been eliminated or modified by the others. It is a mixture consisting of

Ethyl Chlorid.....60 parts
Methyl Chlorid.....35 parts
Ethyl Bromid..... 5 parts

and those quantities were determined after a series of exhaustive experiments and patient, profound research.

During his studies, Doctor Rolland formulated three propositions:

"First: To produce anesthesia it is necessary that the tension of the anesthetic gas be superior to that of oxygen, so that it may, to a certain extent, take the place of the latter in the pulmonary alreoli.

"Second: The tension of the gas being proportionate to its volatility, the more volatile the gas the easier can it be made to take the place of oxygen.

"Third: The ideal anesthetic, if such be obtainable, would be the one behaving in its conditions of entry, of sojourn, and of exit from the body, as does oxygen.

"Therefore, an anesthetic capable of being absorbed practically in the same manner as oxygen should produce its effect in about fifteen seconds. Then if the administration be discontinued, the anesthetic should be eliminated in proportion, as the corpuscles come again in contact with the oxygen."

Somnoforme is thus absorbed and eliminated, but its persistent analgesic effects result from a powerful impression made upon the nervous elements, as has been shown by microscopical study of the cerebral centers which show the modifications produced on the neuron.

Doctor Rolland, by his experiments, has shown that somnoforme has an elective action on the cells of purkinje, thus suppressing sensitivity to pain and temperature, and when there is saturation or excess of the anesthesia, the pyramidal cells are impressed, determining loss of consciousness.

The first noticeable feature in the administration of somnoforme is the rapidity of its action; from fifteen to thirty seconds being sufficient to produce complete anesthesia, lasting from one minute to (in some cases) two and a half minutes.

One case I had where only one inhalation was taken, and the subject remained perfectly unconscious for fully three minutes, and awoke to tell of pleasant sensations experienced during his slumber.

Four deep, full inhalations are all that are required in most cases, but as many patients fail to breathe deeply after the first effects of the gas are experienced, the mask must be kept over the face slightly longer. But in every case it is safe to say that anesthesia will be produced in one-half the time that would be required with nitrous oxid.

The second remarkable feature is the total absence of cyanosis. I have never seen a case where the slightest evidence of suffocation was manifest. Of course, suffocation could be produced by keeping the mask over the face long enough, as the gas contains no available oxygen, and the patient receives only what air has been forced into the bag by the first exhalation after the mask was applied. But full anesthesia has been produced minutes before any danger from this source would be encountered.

The inhaler is so contructed, however, that it may be used for prolonged anesthesia by simply opening the air valve from time to time, thus replenishing the supply of air in the bag, without removing the mask from the face of the patient.

The lack of any change of color will be appreciated by dentists who have been called upon to administer nitrous oxid to patients who were accompanied by nervous and over-sympathetic friends, which friends have become so exercised over the post-mortem appearance of the sufferer that the whole acquaintance list of both were speedily informed of the horrors of gas, or warned against ever submitting to such death-like conditions.

With somnoforme this difficulty is entirely obliterated. The

color of the lips and cheeks remains absolutely normal.

In anemic patients the color will be slightly deepened to a healthy pink shade, but aside from this no change takes place. Another favorable feature is the absence of struggling or pugnacious manifestations on the part of the subject. I have never had a patient raise his hands in delirious attempt to remove the mask or grasp the hands of the operator.

The odor of the gas is sweet and pleasant, with no caustic action upon the fauces or larynx, and there is therefore no choking, nor any sensation of suffocation, as with nitrous oxid.

Occasionally with the first breath, the patient involuntarily hesitates, as the odor, being quite marked and foreign to the experience, causes a momentary lapse of will-power, but that first breath has produced such a pleasing effect that the breathing is resumed without fear or dread, and two or three more inspirations will have placed the subject in the land of happy dreams.

The anesthetic sleep is influenced by the mental impression existing at the moment consciousness fades away. Let the operator prepare the mind of the subject by suggesting some pleasant condition, such as the sound of sweet music, or floating on tossing ocean billows, and the patient's dream will be characterized by similar sensations.

As regards the dangers of somnoforme: The most significant fact in answer to this question is that with over two hundred thousand administrations of the gas, no death has been caused by its use.

Ether itself produces a mortality ratio of one to sixteen thousand, six hundred and seventy-seven, while chloroform produces one to three thousand, seven hundred and forty-nine administrations.

No person can say, of course, that no death will be caused by it, but after five years of severe tests and extended use, it emerges with a clean and innocent record, which should satisfy even the most discriminating and careful operators as to its safety.

There are conditions which forbid the administration of any and all anesthetics, and in such cases somnoforme should be regarded as inapplicable. But unless the patient is known to be suffering from valvular lesions or fatty degeneration of the heart, tumor of the brain, edema of the glottis or advanced alcoholism, no dangerous symptoms need be feared.

In experimental cases, where somnoforme has been administered to the lower animals for the purpose of producing death, it was found that the respiration ceased, in some cases, six minutes before the heart stopped beating, showing that in a practical case the surgeon would have ample time to resuscitate the patient in case the respiration ceased entirely.

I have given the gas in several cases where the patient claimed to have some trouble with the heart, but as the symptoms were not indicative of serious complications, I proceeded without any but satisfactory results. Nervous patients, and those whose dread of the dental chair have kept them long in a state of apprehension, are not so quickly anesthetized as those of sanguine temperament, but they all succumb, and with less trouble than would have been experienced with gas.

Some cases of nausea have been reported, but as they came from sources where the anesthetic was being used for the first time, undoubtedly more of the agent was given than was necessary. However, such cases are uncommon, and more familiarity with the drug will probably eliminate such experiences.

The indications of complete anesthesia are practically the same as with nitrous oxid. The absence of corneal reflex, together with relaxation of the muscles, and deep, quiet breathing, are the chief indications, and these are usually attained with from two to seven full inspirations.

If the patient hesitates in his breathing, as many will always do during the administration of any kind of anesthetic, a firm pressure on the chest, or a sharply-spoken command, will generally suffice to induce resumption.

I believe that most operators, when administering gas, are in the habit of allowing one breath of fresh air for every six or seven of the gas. With somnoforme, this is not to be done. The pure article should be given until sleep is induced, unless in some special case an extraordinary tolerance of the drug is encountered. Judgment in such cases should govern, and air be admitted by simply opening the valve without removing the mask from the face.

With regard to the length of time a person may be kept under the influence of somnoforme, I will quote from Doctor Rolland, who speaks of a case of gangrene of the cheek, which was operated on at the Bordeaux Dental School. He says:

"I put that person to sleep about fifteen times; at one sitting she took a bottle and a half of somnoforme, and I managed to keep her asleep for twenty minutes. I thought, therefore, that I could use the anesthetic for longer operations. I began the experiments on a guinea pig, which I kept asleep for an hour, and then I tried it on a series of animals for periods of three and four days. A cat which had had its hips broken by a dog I anesthetized for eight hours, then killed it purposely. I have given it for surgeons performing nephrectomy, and operations on the interior of the bladder. I think there need be no anxiety as to its effects."

At a dental meeting a few days since, I anesthetized seven dentists, one after another, immediately as they arose from the banquet table, and as I presume all those stomachs were comfortably well filled, it is quite remarkable that no nausea was produced by the gas. At another meeting, one gentleman was fully anesthetized three times, at his own request, and experienced no unpleasant effects.

I have given it four times within half an hour to one patient, where almost a full upper and lower set of teeth and roots were extracted, without a sign of nausea or headache resulting.

The inventor claims that nausea is produced in only one per cent of his cases. Its action on the heart is that of a mild stimulant. The pulse quickens a trifle at first and then falls to normal. The respirations are deep, and in most cases quiet and regular. A quiet snoring is one of the indications of complete anesthesia. Stertorous breathing is seldom or never produced, and jacitation of the limbs is an uncommon occurrence.

It is not claimed that somnoforme is the ideal anesthetic, for if such a thing were possible, it would need to possess as many different properties as there are different ideas concerning what an ideal anesthetic should be. But it is claimed that it is the safest, cheapest and most convenient, and in every way the most satisfactory anesthetic agent yet produced, and we agree with Doctor Beaudry-Mills, who says, "Get used to it as quickly as you can."—*Dental Summary.*

The Dental Digest.

PUBLISHED THE LAST WEEK OF EVERY MONTH

At 2231 Prairie Avenue, Chicago,

Where All Communications Should be Addressed.

In Memoriam.

It will doubtless come as a shock to the readers of this journal to learn that its editor, Mr. D. Howard Crouse, passed away at his home in this city on January 3rd. He had been ailing for some time and had planned to spend the rest of the winter in the South, but his illness took a sudden turn for the worse, almost immediately subsequent to the publication of our last issue, from which time he steadily failed until the end. His death came as the almost direct result of overwork and although only thirty-two years of age he had accomplished as much if not more during his brief business career than the average man accomplishes in a lifetime covering three score years and more. A brief review of his life and the labors which he had undertaken and carried on so successfully will doubtless be appreciated by every reader.

Born in Chicago in 1873, he was the elder son of Dr. and Mrs. J. N. Crouse. He developed an aptitude for books at a very early age and in course of time entered one of the public schools of this city. After a short period spent here, he was placed under care of private tutors and from this training passed on to enlarged fields of learning, the Northwestern Academy and later Lawrenceville Preparatory School. As had been anticipated it was such training as was afforded at these schools that he most needed, as it brought him in contact with large numbers of boys and compelled him to fight his own battles, thus in a measure moulding his character for the struggles of his later life in the world of business. As a foundation for all this he had started with an intense love of his home and

parents, so that his character was far from being in any sense one-sided. Owing to his previous studies he was enabled to commence with the second year course at Lawrenceville and after studying three years at this school he graduated with honors. Upon his return to Chicago he pursued still further his studies in Latin and Greek at the Chicago University and took special courses in English and literature under private instructors. His love of literary study led him to become a purist in the use of the English language, a qualification which aided him greatly in his journalistic work.

In the month of June, 1899, he was united in marriage to Miss Clara Dorothea Sodt of Barrington, Ill.; an ideal home was established and the sweet romance so happily begun ended only with his death.

In order that every reader may fully understand the great loss sustained, it is necessary to briefly review a few facts with which the dental profession is to a certain extent familiar.

It was in 1888 that his father, Dr. Crouse, organized the Dental Protective Association, the aims and objects of which have been so well and fully described in the past that it is hardly necessary for us to revert to them now. From the start this entailed an immense amount of work which but few can realize; but he who is the subject of this paper was ever ready and willing to help his father and did so on every possible occasion. While the results achieved in this direction, in so far as a large membership was concerned, were not all that had been hoped for, they were sufficiently good to demonstrate the possibility of banding a large portion of the dental profession into one cooperative organization which should be able to not only fight any form of patent abuse, but also control for its own benefit a central source or company manufacturing and vending its own dental supplies. It was in 1893 that steps were taken in this direction and in October, 1894, the Dental Protective Supply Co. was duly incorporated.

Almost immediately following this event came the knowledge that some organ or publication was necessary to serve as a means of reaching the members of the Association as also the profession at large with the view to interesting them in the work of the two aforesaid organizations. This resulted in the publication of the first issue of the Dental Digest in January, 1895. The late Mr. Crouse assumed the editorial chair of this publication almost from

its commencement and held the same from that until our last issue. His natural liking and capacity for literary pursuit at once became apparent. His ideas on editing sometimes ran counter to the wishes of contributors, but he was ever able to defend his point of view, being provided with the best of reasons therefor and was generally able to convince the complaining author of the wisdom of his course.

For some time following the initial appearance of this journal it was published at a loss, but it gradually assumed its place as one of the leaders in the field of dental literature, and finally reached the point where it was on a paying basis, all of this being directly attributable to the thorough work of its editor.

In the latter part of 1897 some changes were made necessary in the conduct of the supply company, and it was here that Mr. Crouse stepped into the breach and threw his whole soul into the work. As stated before, his previous training had well equipped him for the work in connection with the journal, but in so far as the supply business was concerned he had had practically no training. His stepping into the position of manager of the company really meant far more than an outsider would have thought possible. However, well realizing the disadvantages under which he labored, he did not hesitate for an instant, but applied himself to the task with an energy which but few men could have equaled. In the latter part of his school career as also in his travels abroad and throughout the country he had acquired a broad knowledge of affairs and men and these he applied from the start in all his business dealings. With this added to his excellent common sense, his success and that of the two objects of his especial care were soon assured, although what such labors meant to him it was given to but few outside of himself to know.

It is right, now, to mention that Mr. Crouse did not share his father's hopefulness and expectancy of establishing the joint organization referred to in the earlier part of this paper. His experience and observation had been such as to lead him to have but little faith in the ultimate success of such plans. With this in his mind, however, he never once wavered in the work he was doing, and when the time came that the supply company was in a prosperous condition and afforded a good field for investment, he agreed with his father to offer the dental profession an opportunity of forming a cooper-

ative company with a protective department, this latter to take the place of the present protective association, and thus insure permanent protection to the profession. His health began to fail just prior to this time and he was ordered to take a rest by his physician. At first he would not hear of this, but finally consented after having been promised that only when at least 5,000 dentists had taken stock in the supply company would the change which Dr. Crouse desired to put into effect be consummated. In the event of such plan failing he was to be allowed full control of the company with power to carry out the policy which he had inaugurated and wished to carry to a full fruition. As he had feared, where 5,000 dentists were needed to assure its success, not more than 500 signified their willingness to become stockholders, which necessarily resulted in the abandonment of the idea of a cooperative and protective supply company. His strict sense of duty and love for his father impelled him to undertake an amount of work in his brief business career which no man could have done.

In closing we shall speak briefly of his chief characteristics. His physician, who was also his closest friend, said of him: "I have never known a man of such absolute unselfishness, always thinking of others, never of himself; or of such devotion to what he deemed to be his duty."

He was a quick reader of human nature and formed his opinions of people almost intuitively. He was quick to decide in matters of business, but his natural caution, which he had in large measure, and his well balanced judgment kept him from many a mistake. He was a man of force and extraordinary will power, so much so that his influence was unconsciously a dominating one, and yet so generous and kind was his nature that his associates and office force not only respected and admired his ability as a leader but loved him as a man. He had that rare combination of executive ability and literary attainment. He was an omnivorous reader and loved his journal work. When remonstrated with for working upon it at the close of a hard day in business, he would say, "This is not work, this is just recreation." But more than business or literary work he loved his home associations. He was preeminently a domestic man. His wife, home and parents were always first in his thoughts. It was in the home life that he was at his best. Brilliant in conversation, racy in story and anecdote, quick at repartee, with

a warm generous nature, he was naturally the center of the home circle and a favorite on all social occasions; thus, a devoted husband, a loving son, an affectionate brother, a true friend has gone from our midst.—

"Into the eternal shadow
That girds our life around,
Into the infinite silence
Wherewith Death's shore is bound,
Thou hast gone forth, beloved!
And we were mean to weep,
That thou hast left Life's shallows,
And dost possess the Deep."

Notices.

OTTAWA DENTAL SOCIETY.

The Ottawa Dental Society was formed Dec. 9, 1905, and the following officers were elected: President, Mark McElhinney; vice-president, W. A. Graham; secretary, J. Gorman; executive committee, the above officers, M. F. Cross and J. J. Leacy.

CALIFORNIA STATE DENTAL BOARD.

At the recent meeting of the California State Dental Examiners, held at Sacramento, the following officers were elected for the ensuing year: President, G. A. White, Santa Barbara; secretary, C. A. Herrick, Jackson; treasurer, E. G. Howard, Los Angeles.

JEFFERSON COUNTY (WIS.) DENTAL SOCIETY.

At the annual meeting of the Jefferson County Dental Society, held at Watertown, Dec. 12, the following officers were elected for the ensuing year: President, M. J. Terry, Pulaski; vice-president, W. H. Leak, Watertown; secretary and treasurer, Fredk. R. Wagner.

LAMBTON COUNTY (ONT.) DENTAL SOCIETY.

The dentists of Lambton County, Ont., organized Dec. 20, 1905, with the following officers: Honorary presidents, J. Woods, Sarnia, and W. F. B. Colter, Sr., Petrolia; president, W. F. B. Colter, Sarnia; vice-president, G. A. Walters, Forest; secretary-treasurer, J. E. Wilkinson, Petrolia; executive committee, the above officers, Drs. Thornton and C. Colter, Petrolia, and Kinsman, Sarnia; archivist, F. B. Kenward, Watford.

LINCOLN ODONTOGRAPHICAL SOCIETY.

At the monthly meeting of the Lincoln (Neb.) Odontographical Society the following officers were elected for the ensuing year: *President, M. E. Vance*; vice-president, H. C. Victor; secretary-treasurer, E. G. Antrim; members of board of censors, C. R. Tefft and D. P. Sims.

WINNEBAGO COUNTY (ILL.) DENTAL ASSOCIATION.

At the second annual meeting of the Winnebago County Dental Association, held at Rockford, Dec. 8, 1905, the following officers were elected for the ensuing year: *President, F. A. Weld, Belvidere*; vice-president, T. E. Fouser, Rochelle; secretary, A. B. Culhane; treasurer, M. L. Hanaford.

THE FRATERNAL DENTAL SOCIETY OF ST. LOUIS.

At a meeting of the Fraternal Dental Society of St. Louis, held Dec. 29, 1905, the following officers were elected: President, E. P. Dameron; vice-president, S. H. Voyles; secretary, Richard Summa; treasurer, W. E. Brown; executive committee, E. E. Haverstick, I. A. Voss, and W. H. Simpson.

NATIONAL CAPITAL DENTAL SOCIETY.

At a meeting of the National Capital Dental Society, held at Washington, D. C., Dec. 2, 1905, the following officers were elected: President, Starr Parsons; vice-president, F. F. Daly; recording secretary, C. W. Cuthbertson; corresponding secretary, W. B. Daly; treasurer, George S. Waldo; librarian, Z. W. Alderman.

NEW HAVEN DENTAL SOCIETY.

The annual election of officers of the New Haven Dental Society occurred Dec. 14, 1905, and resulted as follows: President, H. A. Spang; vice-president, E. S. Gaylord; secretary, Frank Cory; treasurer, T. L. Lawton; financial committee, D. W. Johnston, T. J. Corbett. The annual banquet will be held at the January meeting.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the Wisconsin State Board of Dental Examiners for examination of candidates for license to practice dentistry in Wisconsin will be held in Milwaukee, Jan. 29, 1906, at the Hotel Pfister.

Applications must be made to the secretary fifteen days before examination. The candidate must be a graduate of a reputable dental college, or have been engaged in the reputable practice of dentistry consecutively for four years, or an apprentice to a dentist engaged in the reputable practice of dentistry for five years. For further particulars apply to

J. J. WRIGHT, Secretary,
1218 Wells Bldg., Milwaukee, Wis.

SCANDINAVIAN-AMERICAN DENTAL ASSOCIATION OF CHICAGO.

At the annual meeting of the Scandinavian-American Dental Association of Chicago Dec. 26, 1905, the following officers were elected: President, C. E. Johnson; vice-president, O. M. Ulvestad; secretary and treasurer, John Nelson; directors, O. T. Johnson, P. W. Thorelius and Maurice Schycker.

UTICA (N. Y.) DENTAL SOCIETY.

The first regular meeting of the recently formed Utica Dental Society was held Dec. 16, and the following officers were elected: President, H. H. Tompkins; vice-president, W. B. Capron; secretary, H. M. Clapp; treasurer, F. T. Simmons.

FOX RIVER VALLEY (ILL.) DENTAL ASSOCIATION.

At the last meeting of the Fox River Valley Dental Association the following officers were elected: President, Chas. E. Smith, St. Charles; vice-president, E. C. Moore, Elgin; secretary and treasurer, C. M. Patterson, Genoa. Fredk. Miller of St. Charles was elected chairman of the membership committee. The next meeting will be held at St. Charles, March 14, 1906.

RESOLUTIONS ON THE DEATH OF DR C. C. CHITTENDEN.

In respect to the memory of Dr. Charles C. Chittenden, the Odontological Society of Madison adopted the following resolutions on December 16:

WHEREAS, The hand of Providence has removed from us our honored member and president, Dr. Charles C. Chittenden; and

WHEREAS, In his decease we have lost one of the founders of our association, who, as president and as an active member until his death, evinced a warm interest in its welfare. As president of the National Dental Association, president of the National Association of Dental Examiners and also president of the State Board of Dental Examiners for many years, he gave freely of his time and energy, sacrificing his health for the advancement and betterment of dental education, and who in many years of practice set before us a worthy example of fidelity to his patients, and kindly interest in his younger professional brethren; therefore, be it

Resolved, That we desire to express to his bereaved family our sympathy and sorrow in their affliction and our admiration for the professional and personal qualities of our member; and

Resolved, That these resolutions be spread upon the records of our association, a copy sent the family of our departed brother and others to the dental journals for publication.

ODONTOLOGICAL SOCIETY OF MADISON.
W. H. MUELLER,
O. C. SCHMEDEMAN,
F. T. MCCONNELL. } Committee.

MONMOUTH COUNTY (N. J.) DENTAL SOCIETY.

At the annual meeting of the Monmouth County Dental Society held at Asbury Park, Dec. 22, 1905, the following officers were elected: President, A. S. Burton, Asbury Park; vice-president, Fredk. Burge; secretary, H. S. Taylor; treasurer, Dr. Tompkins. Dr. Pratt was elected as a member of the executive committee and Dr. Wm. Truex of Freehold was installed as an active member.

CHAMPAIGN-DANVILLE (ILL.) DISTRICT DENTAL SOCIETY.

The Champaign-Danville (Ill.) District Dental Society met Dec. 5, 1905, and elected the following officers: President, Dr. Miller, Hoopeston; vice-president, C. C. Van Scoyoc, Champaign; secretary, Dr. Bush, Rossville; treasurer, C. P. Howard, Champaign; librarian, F. M. Conkey, Homer; program committee, F. O. Sale and Dr. Wallas of Urbana, W. H. Boone of Champaign. The next meeting of the society will be held in Danville on the first Tuesday in February.

OHIO STATE DENTAL SOCIETY.

At the last meeting of the Ohio State Dental Society, held at Columbus, Dec. 5, 1905, the following officers were elected: President, H. L. Ambler, Cleveland; 1st vice-president, H. C. Brown, Columbus; 2d vice-president, C. I. Keely, Hamilton; secretary, F. R. Chapman, Columbus; treasurer, W. A. Price, Cleveland; directors (to serve three years), L. P. Bethel, Columbus, Henry Barnes, Cleveland, J. R. Callahan, Cincinnati, and W. T. McLean, Cincinnati.

ALUMNI ASSOCIATION OF THE CHICAGO COLLEGE OF DENTAL SURGERY.

The eleventh annual clinic of the Chicago College of Dental Surgery will be held at the College Building, Chicago, Jan. 17 and 18, 1906. This meeting will be a reunion of all the graduates of the college regardless of whether they are members of the Alumni. A very excellent program is being arranged, consisting of papers with discussion, clinics and banquet. Rates on all railroads of one-third fare on the certificate plan have been arranged. RUDOLPH BECK, President.

HORACE WELLS CLUB (Formerly QUONEHTACUT).

The Quonehtacut Club (Conn.) changed its name to the Horace Wells Club at the annual meeting Dec. 11, 1905, in celebration of the sixty-first anniversary of the discovery of anesthesia by Horace Wells. The following officers were also elected: President, J. H. McManus, Hartford; vice-president, N. J. Goodwin, Hartford; secretary and treasurer, Chas. McManus, Hartford; council, C. W. Strang, Bridgeport, R. M. Gaylord, New Haven, C. Fones, Bridgeport, and C. F. Gibbs, Bridgeport.

SYRACUSE (N. Y.) DENTAL ASSOCIATION.

The annual election of officers of the Syracuse Dental Association was held Dec. 5, 1905, and the following officers were elected: President, J. H. Dower; vice-president, C. G. Schaum; secretary and treasurer, Chas. E. Rowland; recorder, C. J. Peters; program committee, A. M. Lafayette and G. B. Beach.

LYCOMING COUNTY (PA.) DENTAL SOCIETY.

At the meeting of the Lycoming County Dental Society, held at Williamsport, Dec. 17, 1905, the following officers were elected: President, W. F. Harrer, Montoursville; vice-president, H. T. Smith, Hughesville; secretary, B. B. Sprout; treasurer, S. L. Jordan; executive committee, C. C. Walker, N. R. Hubbard and W. W. Hertz; ethical committee, G. W. Klump, L. H. Voelkler and A. V. Robbins.

LUZERNE AND LACKAWANNA (PA.) DENTAL SOCIETY.

At the annual meeting of the Luzerne and Lackawanna Dental Society, held at Wilkesbarre, Dec. 19, 1905, the following officers were elected: President, W. A. Spencer, Carbondale; vice-president, Wm. Kelley, Wilkesbarre; secretary, Dr. Donnegan, Scranton; treasurer, George Knox, Scranton. The next meeting of the society will be held in connection with the annual banquet, which will be held at the Wyoming Valley Hotel, Wilkesbarre, Jan. 23, 1906.

RESOLUTIONS ON THE DEATH OF DR. C. C. CHITTENDEN.

WHEREAS, We have learned to-day of the death of our dear friend and eminent professional brother, Dr. Chas. C. Chittenden.

Resolved, That the Milwaukee Odontological Society, in special meeting assembled, extend to Miss Chittenden, and to other near relatives of our friend, our sincere and heartfelt sympathy.

Resolved, That as individuals we mourn the loss of a friend whose loving and lovable qualities of mind and heart, and whose high personal character drew to himself and held the affection and respect of men to a degree which few men have ever been privileged to enjoy.

Resolved, That by his life-long devotion and self-sacrifice, and by his untiring and successful work in national and state bodies for the advancement of dentistry, he has rendered an ever-enduring service to his profession and the public, and builded for himself an imperishable monument.

Resolved, That these resolutions be spread upon the records of this society and a copy be sent to Miss Chittenden at Madison.

MILWAUKEE ODONTOLOGICAL SOCIETY,
W. H. CUDWORTH, President,
ADOLPH GROPPER, Secretary.

LATEST DENTAL PATENTS.

805,171. Artificial tooth, Emory L. Townsend, Los Angeles, Cal.

805,733. Tooth brush, Eduardo W. Key, Southwest City, Mo.

805,974. Manufacture of roof dental plates, Peter J. Malone, Altoona, Pa.

806,034. Artificial tooth fastening for bridgework, Thomas H. Whiteside, Youngstown, Ohio.

806,300. Dental ligature applier, James Sorenson, Neenah, Wis.

806,345. Suction attachment for dental plates, John A. Johnson, Middletown, Del.

807,620. Mercury and amalgam separator, Henry J. Horstmann, Fort Wayne, Ind.

News Summary.

R. H. P. LULON, a dentist of Detroit, Minn., died Dec. 3, 1905.

W. H. HOGSHEAD, a dentist of Mendocino, Cal., died Dec. 18, 1905.

I. COOK, a dentist of Madeira, Cal., died Dec. 1, 1905, of pneumonia.

GEO. W. COY, a dentist of Otsego, N. Y., died Dec. 16, 1905, from paralysis.

J. J. BODWELL, a dentist of Winamac, Ind., committed suicide Dec. 13, 1905.

JAMES HILLMAN, a dentist of Shawnee, Okla., was fatally shot Dec. 1, 1905.

M. M. CASEY, a dentist of Marion, O., died of heart failure Nov. 17, 1905.

J. Z. MCBRIDE, aged 58, a dentist of Burgettstown, Pa., died Dec. 21, 1905.

W. W. SINKS, a dentist of Giddings, Tex., died Dec. 23, 1905, of tuberculosis.

C. S. BECKE, 77 years of age, a dentist of Wilkesbarre, Pa., died Dec. 25, 1905.

W. E. MULLIN, 67 years of age, a dentist of Downs, Kan., died Dec. 24, 1905.

D. W. CLANCEY, 62 years old, a dentist of Cincinnati, O., died Dec. 24, 1905.

GEORGE B. DORSEY, a dentist of Vicksburg, Tenn., died Nov. 26, 1905, from heart failure.

W. B. WOODWARD, formerly a dentist of Peoria, Ill., died at Los Angeles, Cal., Dec. 26, 1905.

VAN DYKE SCHERMERHORN, 63 years old, a dentist of Upper Troy, N. Y., died Dec. 23, 1905.

ALFRED L. PUCKEY, a dentist of Waterville, N. Y., died Dec. 17, 1905, from typhoid fever.

M. H. CHAPPELL, 64 years old, a dentist of Knightstown, Ind., died Dec. 14, 1905, from apoplexy.

C. P. DEMING, a dentist of Ashland, Wis., died Dec. 24, 1905, from heart failure; 36 years old.

R. B. MARTIN, 60 years of age, a dentist of Rocky Mount, La., was shot and killed Nov. 27, 1905.

LAWTON BOYD, 25 years old, a dentist of Cross Keys, Ga., died Nov. 29, 1905, after a long illness.

FRANKLIN S. GRAVES, 71 years old, a dentist of Battle Creek, Mich., died Dec. 16, 1905, from paralysis.

R. H. PHALON, 55 years of age, a dentist of Wadena, Minn., died Dec. 2, 1905, after a lingering illness.

F. M. KELTNER, 51 years of age, a dentist of Muncie, Ind., died Dec. 14, 1905, after a seven weeks' illness.

GEORGE I. ROBB, 40 years old, a dentist of Philadelphia, died Nov. 27, 1905, after an illness of almost a year.

CHARLES R. SILVERWOOD, 34 years of age, a dentist of Kingwood, W. Va., died Nov. 29, 1905, after a brief illness.

CHARLES T. SEADE, dentist to the imperial family of Russia for the past three years, died Dec. 1, 1905, from typhoid fever.

MARTIN YOUNG SIMMONS, 73 years old, a dentist of Providence, R. I., for fifty-five years, died Dec. 12, 1905, of heart failure.

CHARLES BREWSTER, a dentist of Montreal, Can., died at Lacolle, near Lake Champlain, Nov. 30, 1905, after a period of ill health.

L. A. MELZE, 58 years old, a dentist of Chicago, died Dec. 29, 1905. His death was due directly to his eating a hearty meal after five years of dieting.

C. C. CHITTENDEN, 63 years old, a dentist of Madison, Wis., president of Wisconsin State Dental Board and at one time president of the National Dental Association, died Dec. 15, 1905.

DAMAGE SUIT.—A woman in St. Louis was recently granted $441 damages for alleged laceration of her mouth and tongue.

PORCELAIN INLAYS: WHERE NOT INDICATED.—Is there any sharp, definable line that marks the limits of the field of the porcelain inlay? Yes; exposure of the margins to the stress of mastication.—J. E. NYMAN, *Dental Summary.*

FALSE TEETH A LIFE SAVER.—A man at Anaconda, Mont., was shot through the cheek recently, according to newspaper report, knocking out two false teeth, which deflected the bullet that otherwise would have passed through his brain.

THE ADDITION OF GOLD TO AMALGAM.—Amalgam is materially improved by the addition of gold; it gives additional edge strength and adds materially to the quality and also to the setting of the alloy.—F. E. HOWARD, *Dental Cosmos.*

ROUGHEN THE CAVITY SIDE OF YOUR INLAYS.—Inlays will not remain in cavities by the force of faith alone, and neither will they always remain by the adhesive properties of cement. Get as deep anchorage as possible in your cavity preparation, and then if the inlay is of porcelain etch the cavity side with hydrofluoric acid to roughen it. If it has sufficient bulk

groove it. With gold inlays they can almost invariably be grooved to advantage. Prepare the cavity side in such a way that the cement will take hold of it firmly. Do not depend on faith.—*Review.*

Divorces.—Joseph L. Martin, a dentist of Detroit, Mich., is seeking a divorce from his wife.—Horace W. Welch, a dentist of Detroit, Mich., is defendant in a divorce case, his wife claiming nonsupport.—The wife of Myron L. Catham, a dentist of Cleveland, has been granted a divorce.

Dental Certificate Forgers Sent to Prison.—Dr. Jacob H. Smyser, former secretary of the Illinois State Dental Board, and his assistant, Edward Flynn, were recently fined $300 each and sentenced to the penitentiary for indeterminate terms for selling licenses to incompetent students.

A Subject for Diagnosis.—The papers announce that a Chicago hotel waiter was "accidentally shot in the pantry." Why will the papers insist on using these medical terms? We don't know just how much to sympathize with the poor fellow. It is to be hoped the pantry is not a vital spot.—*Exch.*

Hardening Plaster Models.—Plaster models of orthodontia cases, etc., may be hardened and given a marble-like surface by boiling them in stearin. The models must be thoroughly dry before putting them into the boiling stearin. Use a double boiler, like a glue-pot, for melting the stearin.—*Dental Register.*

Tooth in Nasal Organ.—A perfectly-formed incisor was recently removed from the nose of an Ohioan, who had been suffering for several years with what he supposed to be an acute case of catarrh. The arch had space for the incisor, but for some reason nature chose a different course for this tooth to follow.

Robberies.—S. C. Hornef, Oakland, Cal., Dec. 26; $300.—M. L. Menges, Chicago, Dec. 1; $50.—T. J. Houston, Peoria, Ill., Dec. 17; $400.—E. H. Collins, Lake Charles, La., Dec. 20; $20.—J. J. Perry, Detroit, Mich., Dec. 21; $77.—Boston Dental Co., Cincinnati, O., Dec. 24; $100.—F. O. Wermuth, Milwaukee, Wis., Dec. 25; $10.

Easy Method of Removing Regulating Bands.—To remove regulating bands or crowns, grasp the band with forceps and squeeze with firm pressure, repeating the process around the tooth if possible. This will loosen the cement and may even expand the band so that it can be easily removed.—F. W. Stephan, *Dental Review.*

Bankrupts.—Melville B. Buckley, a dentist of Boston, filed a petition in bankruptcy, with liabilities amounting to $737 and assets, $77.50.—George O. Lawton, a dentist of St. Paul, filed a petition in bankruptcy Dec. 24. The schedule shows debts amounting to $46,502.98 and assets amounting to $1,068.77, of which $175 worth are exempt.

A Reinforced Wedge.—This form of wedge is particularly applicable for cases wherein it becomes necessary to wedge across wide spaces, as in regaining the space of a missing tooth. It consists of the usual piece of cottonwood which has been compressed with the pliers or vise and carved to the desired size and shape. Through the wedge thus prepared a hole is

drilled, and into it is threaded and compressed a large piece of ordinary separating rubber. The principle of it is, that after the wood has expanded to its limit it will relieve the pressure on the rubber, which will attempt to resume its original shape, thus forcing the sides of the wedge farther apart.—FREDERICK CROSBY BRUSH, *Dental Brief.*

A LABORATORY HINT.—When working with wax in the laboratory, use a large common school slate for a bench cover; it will catch all pieces and drops of melted wax, and when removed leaves the bench clean and ready for the next work. Wax spots on a bench may be very annoying when gold work is being done.—*Dental Register.*

SECONDARY LOCALIZATION OF LUPUS.—(Dr. V. Chilé, *Russki Journal*). It has been observed that lupus begins ordinarily upon those parts of the body ordinarily exposed, particularly the face, but that the secondary localization is very frequently upon the gums. In thirty out of a series of fifty patients the disease eventually became localized upon the gums.

CHART SHOWING THE FIFTH NERVE.—Cut out page 575 DENTAL DIGEST for June, 1905, and tack it upon the wall of your operating room. It contains a chart showing the fifth nerve, its branches, etc., and will materially assist you in explaining to a suffering patient why and how pain may be felt at a point remote from the cause.—W. H. REABEN, McCOMB, MISS.

GRAVE DANGER IN PATIENT'S COUGH.—A well-known Denver dentist is suing to recover $1,475 which he claims due on an accident policy. The accident occurred in 1902, and was an unusual one. While extracting the teeth of a patient, the latter coughed and particles of pus from ulcerated teeth flew into the dentist's eye, and he nearly lost the sight of an eye from poisoning.

DARKENING THE SHADE OF "PHOSPHATE" FILLINGS.—By using a German silver spatula the shade of these fillings can be darkened to a great extent, and the color produced is permanent, no doubt due to the action of the fluid upon the metallic spatula. With a little practice a great variety of shades can be produced. The darkest shades are produced by prolonged use of the spatula.—WALTER HARRISON, *Brit. Dental Journal.*

PRECAUTIONS WHEN TAKING PLASTER IMPRESSIONS.—When impressions are to be taken, note all conditions of the mouth carefully. If a thick, viscid saliva be present, it may be overcome by rinsing the mouth thoroughly with milk of magnesia. The adhesion of the impression material to the teeth may be prevented by coating them slightly with vaselin, or by rinsing the mouth with milk of magnesia just before the operation.—*Dental Register.*

ACCIDENTS.—Dec. 17, a man in Webster City, Ia., in his anxiety to dodge a sheriff who was seeking to serve a notice upon him, ran into a clothesline with such force that his false teeth were forced down his throat. A physician was summoned, however, and speedily removed the teeth, and the sheriff served his notice.—A dentist of Adrian, Mich., lost the sight of one eye, Dec. 27, when a vulcanizer exploded in his rooms.—Nov. 27, a man

at Norfolk, Va., suffered an attack of paralysis, while in a dentist's chair.—Dec. 8, a dentist of Beckley, W. Va., took a tablespoonful of carbolic acid, mistaking it for castor oil. Owing to his own knowledge of antidotes and with the aid of physicians, it is thought he will recover.

FRESHENING PLASTER.—Dental plaster which has gathered moisture can be freshened and slaked by heating a brick to almost red heat and burying it in the plaster.—*Tri-State Dental Quarterly.*

ADMINISTERING SOMNOFORME.—In administering somnoforme, as in fact with most anesthetics, the amount of air admitted has a great influence on the duration of the period of excitement. With robust subjects the more rapid and profound the anesthetic the safer the operation will be. With questionable subjects who exhibit distress the only guide must be the judgment arising from the experience of the operator.—MARK G. MCELHINNEY, OTTAWA, CANADA, *in Review.*

PULP-CAPPING MATERIAL.—Dry the cavity, then coat the exposure with a chloform solution of guttapercha, drying this by means of the chip-blower before placing the cement-filled shells in position. As a bar to thermal changes, and—what is perhaps quite as important—those sometimes charged against the chemical action of the phosphoric acid, it meets the requirements as perfectly as anything else within our reach.—W. A. BOSTWICK, *Dental Office and Laboratory.*

THE BILL.—Patient: It seems to me your charge is tough
For a few minutes' work;
A quarter ought to be enough,
For just so small a jerk.

Dentist: My duty, sir, I do not shirk;
I did it well, you will allow;
But it's fifty cents for that small jerk,
And that much more for knowing how.—J. F. STEELE, *Dental Hints.*

COCAIN ANESTHESIA.—Means says that Reclus, who reports 7,000 operations under cocain anesthesia without a death, insists on the observance of the following rules: (1) Never use a stronger solution than 5 per cent. externally, or 1 per cent. hypodermically. (2) Always have the patient recline during the administration of the anesthetic and not get up for half an hour after. (3) Always have the patient eat and drink something before rising.—*Columbus Med. Journal.*

TO HOLD CROWNS WHILE POLISHING.—Cut a pine stick to fit the crown loosely, coat it with shellac by heating both in a flame, then force it into the crown, previously filled with a mix of salted plaster, and it is ready for the buff. To remove the crown heat in a flame, and with a napkin to protect the fingers, pull it from the stick. Lac on the stick prevents the wood from drinking in the water of the plaster, and when heated, makes the stick easy of removal. The salt hardens the plaster immediately, and the heat generated in the buffing and that of the flame perfects it, and as a final result the plaster comes away in scales, leaving the inner surface of

the crown as clean as when first made ready for the polishing process.—*Dental Office and Laboratory.*

ICHTHYOL FOR INFLAMMATORY AND SEPTIC CONDITIONS.—Ichthyol is a most valuable substance to reduce inflammatory swelling and in septic conditions affecting the skin. Its disagreeable odor is very distressing to many patients, but it can be concealed by the addition of oil of citronella, 20 minims to the ounce of ointment. Oil of roses also does well, but is very expensive.—*Med. Standard.*

EXAMINING BOARD AFFAIRS.—At the last meeting of the California Board 19 out of 41 applicants were successful in passing the examination.—Dec. 4 the governor appointed Herbert S. Sutphen of Newark as a member of the New Jersey Board in place of Chas. S. Stockton of Newark, resigned.—The governor of Wisconsin announced the following appointments on the State Dental Board: John Wright, Milwaukee; Chas. H. Seeger, Manitowoc, and George C. Marlow, Lancaster.

The patient (his name was Elijah)
Said, "Really, I'd like to oblijah,
But you're asking too much;
It rouses my Dutch,
And I'm sorry I ever emplijah."

A SIMPLE PROTECTOR FOR THE HOT-AIR SYRINGE.—The metal portion or end of the syringe may be covered with a piece of white rubber tubing of the same diameter; the tubing to be about an inch shorter than the metal end. When in use, the tubing is to be drawn up on the metal toward the bulb, exposing the tip for heating; after which the tubing is pushed out so as to cover the point, thus confining the heat and, being a non-conductor, effectually preventing the burning of the lips or mucous tissue.—FREDERICK CROSBY BRUSH, *Dental Brief.*

JARRED!—In making the trip from the cottage over a wet walk to the dock, the lady lost her feet and forthwith sat down hard, breaking off as a partial result of the mishap an upper lateral incisor. Later, holding the fragment in the palm of her hand, at the same time showing where it had come from, she asked the small boy: "What do you think of that?" On completing his examination he remarked in the phrase of the day: "Now, wouldn't that jar you!" "Jar me? That's what it did."—*Dent. Off. and Lab.*

SOLDERING PLATES TOGETHER OBJECTIONABLE PRACTICE.—I object to soldering plates together to stiffen them. A plate that is so constructed has lost all its elasticity; when bent it stays bent. It is better to have one plate of sufficient thickness to give the stability required, than to solder two plates together. I do not object to the use of 18-k. gold in the mouth. I use it a great deal, especially in the lower teeth. There is one great objection to the use of a higher grade gold: it is softer, more easily adapted to the mouth, and consequently cannot bear the strain in the mouth so well. For partial plates I frequently use the alloy of gold and platinum called clasp

metal. If rubber adheres to 18-k. gold, so much the better; that is the gold to use, and not the higher grade.—G. W. HASKINS, *Dental Review*.

ILLEGAL PRACTITIONERS.—Dec. 4, a man of Shelton, Conn., was fined $5 and costs for practising dentistry without a license. An appeal was taken.—Dec. 7, a man of Macon, Ga., was fined $125 for practising dentistry without a license.—Dec. 8, a man at Louisville, Ky., was fined $15 for practising dentistry without a license.—Several weeks ago a man of Lee, Mass., was arrested for practising dentistry without a license. He was fined $50.—Dec. 6, a man of Columbus, O., was fined $50 and costs for practising dentistry without a license.—Dec. 12, three men were indicted at Parkersburg, W. Va., for practising dentistry without a license.

ELECTRIC TREATMENT.—"Electricity in the atmosphere affects your system," said the scientific physician.

"Yes," said the patient, who had paid ten dollars for two visits, "I agree with you; there are times when one feels overcharged."—*Exch.*

FIRES.—Robert E. O'Connell, San Francisco, Cal., Nov. 28; loss $55.—E. P. Cunningham, Goshen, Ind., Nov. 20; loss $50.—Dr. Housholder, Maxwell, Ia., Dec. 11; nominal loss.—Cora McGrew, Holton, Kan., Nov. 28; loss $3,000.—Dr. Woolfolk, Troy, Mo., Dec. 20; nominal loss.—William Carrier, Brooklyn, N. Y., Dec. 14; loss $7,000.—S. A. Phillips, Coudersport, Pa., Dec. 17; loss $100.—Charles C. Richey, York, Pa., Dec. 1; loss $2,500.—A. H. Spicer & Son, Westerly, R. I., Dec. 23; nominal loss.—A. M. Foristore, Kenton, Tenn., Dec. 7; loss nominal.—People's Dentists, Milwaukee, Wis., Dec. 14; loss $500.—American Dental Co., Milwaukee, Wis., Dec. 13; loss $3,000, partly covered by insurance.

EMERGENCY TREATMENTS.—Frequently patients call at the office with an aching tooth, at a time when the dentist is extremely busy. It seems that most dentists are getting into the habit of placing some medicine in the cavity—if there is one—or smearing something over the gums, without examining the case, and dismissing the patient until he has more time. This would be all right were it not for the fact that the patient might suffer in the meantime. We must employ different treatments to relieve different conditions and a proper diagnosis should be made of each case always. If it is necessary to remove a filling remove it at once and get at the cause of the trouble as quickly as possible. It will make it easier in the end.—*Review.*

FATALITIES.—Dec. 6 a woman, 30 years of age, had a dentist at Seaforth, Can., give her an anesthetic and then extract a number of teeth. She passed away a few minutes later.—Nov. 27 a woman of Presque Isle died suddenly while under the influence of chloroform in a dental chair, after the extraction of a few teeth.—Dec. 10 a young woman of Jersey City, N. J., died at her home after having some teeth removed by her dentist. A physician administered the anesthetic, but the woman's vitality was so low that she did not regain consciousness.—Dec. 7, a man, 44 years old, died in a New York dentist's chair, after taking gas and having an abscess treated.—Dec. 14, a young man of Coshocton, Pa., died of apoplexy while

waiting for a dentist to extract an aching tooth.—Dec. 22, a young man of Knoxville, Tenn., died of heart failure, as a result of an abscessed tooth.—Dec. 11, a woman in Beloit, Wis., died while under the influence of chloroform administered during a dental operation.

SOLDERING OF ALUMINUM.—Wagner of Berlin recommends the following for soldering aluminum and its alloys:

He uses a flux formed of:

80 parts of stearic acid.
10 parts of chloride of zinc.
10 parts of chloride of tin.

Any ordinary soft solder can be employed, but the best is that composed of:

80 parts of tin and
20 parts of zinc.

After the dentures to be soldered have been cleansed and passed through the flux the soldering is done in the usual way.—*Revue Scientifique.*

A GOOD SUGGESTION.—Dr. J. H. Graham of Lead, S. D., sends the following suggestion: Dentists, as a rule, subscribe for from three to six dental journals and in reading the same come across many useful hints or suggestions, which we feel we would like to try, should occasion present. But having no case at the time suitable to demonstrate the value of the suggestion, or from some other cause we lay the journal aside and the matter passes out of our mind. It has been a custom with me for a number of years to keep a scrap book, and when I come across a suggestion in a dental journal that appeals to me, as of value, I cut it out and paste it in the same. In this way I get what appeals to me as the meat of our dental literature, boiled down for quick and easy reference.—*Dental Summary.*

MARRIAGES.—Leo F. Banghart, a dentist of Bruce, Wis., was married to Miss Levyna Munson of La Crosse, Wis., Dec. 23.—Willard A. Currie, a dentist of Cambridge, Mass., was married to Dr. Mae M. Purdie of Cambridge, Dec. 26.—Eunice Daly, a dentist of Cambridge, Neb., was married to Thomas Andrews of Cambridge, Nov. 30.—Roy B. Dier, a dentist of Ladysmith, B. C., was married to Miss Gertrude C. Williams of Ladysmith, Dec. 23.—Ervin E. Dougherty, a dentist of New Berlin, O., was married to Miss Carrie E. Shook of New Berlin, Nov. 29.—William C. Drakeford, a dentist of Huntsville, Tenn., was married to Miss Jennie Teager of Memphis, Dec. 25.—John M. Evey, a dentist of Monmouth, Ill., was married to Miss Olga Stoecks of Bloomington, Dec. 22.—George M. Freeman, a dentist of Seattle, Wash., was married to Miss Geneva Violet Lang of Walla Walla, Wash., Dec. 25.—Harry Guylmer, a dentist of Elkhart, Ind., was married to Miss May Haws of Madison some time ago, but it has just been announced.—Joseph L. Hooper, a dentist of Chicago, was married to Miss Mabel Markley of Eaton, O., Dec. 7.—Sidney Gould Main, a dentist of Ishpeming, Mich., was married to Miss Maud Ethel Moore of Valparaiso, Ind., Dec. 28.—Peter McPherson, a dentist of Caledonia, N. Y., was married to Miss Bessie McNaughton of Mumford, N. Y., Nov. 28.—Harry Ogden, a dentist of New York City, was married to Miss Sallie L.

Johnson of Woodville, Va., Nov. 30.—C. W. Scott, a dentist of Fruitvale, Cal., was married to Miss Katherine Grace Kennedy of San Francisco, Dec. 21.—Caleb Sickles, a dentist of Tiffin, O., was married to Miss Mabel Teachnor of Blanchester, O., Dec. 6.—Wm. S. Taylor, a dentist of Lewistown, Pa., was married to Miss Florence Rutherford of Laurelton, Pa., Nov. 30.

PRACTICAL THINGS THAT COUNT.—A small piece of pure soap will be found useful in many ways during operations. The mouth-mirror may be kept from clouding by coating the glass with dry soap, and then wiping clean with a dry napkin. The edge of a sandpaper disk will not catch in the rubber dam when polishing fillings, if it is first run in the soap. Disks and strips will cut faster and polish better if slightly soaped on the grit side before using. Disks and strips thus prepared that are used for polishing gold fillings will retain the particles of gold, and if saved and refined will more than pay for the trouble. Rubber dam will slip easily over the teeth if soaped around the holes. Ligature silk when soaped slips easily between the teeth. Use pure soap and sparingly, and it will not be disagreeable to the patient.—*Dental Register.*

GINGIVITIS.—The following combinations are recommended by *Merck's Archives* in the treatment of gingivitis:

℞—Salol, gr. xv;
Spts. menth. pip., ʒx;
Tinct. catechu, ʒj.
M.

Sig.—One teaspoonful in half a glass of warm water as a mouth-wash; or:

℞—Acidi carbol.,
Pot. chloratis, āā gr. xx;
Syrupi simp., ʒj;
Aq. camphoræ, ʒiij.
M.

Sig.—One dessertspoonful as a mouth-wash, diluted in half a glass of water.—*Monthly Cyclopedia.*

SOME CHINESE MEDICINES.—Many absurd beliefs recorded in the Chinese materia medica are set forth by S. Synge (*Dublin Journal of Medical Science*). Iron sulfate is said to go at once to the liver and gall-bladder, and to be good when the liver is inflamed; it is also good for cough, epilepsy, hematuria, etc. It is said to be obtained from copper pits and to be the fluid part of the copper, thus enabling it to go to the liver. The color of the best preparation should resemble the inside of the mouth of a green frog. The human placenta is said to cure weaknesses, thinness, wasting diseases, madness and epilepsy; it should be taken from a healthy primipara, washed in a running brook, then boiled, after which it may be toasted or powdered, or eaten after the boiling with rice. Powdered tiger-bones are thought to give strength. The urine obtained from the white horse, the ass, and children is given in fevers. Another absurdity recorded

is that when a placenta does not come away it goes up into the woman's chest and suffocates her. It is also believed that the milk comes into a mother's breast with the incoming of the tide.

OBTAINING PERFECT CONTACT POINT AND CORRECT OCCLUSION IN LARGE PORCELAIN INLAY RESTORATIONS METHOD.—Fill matrix nearly to occlusion with porcelain in the ordinary way, being careful not to have any cracks in the margin of the matrix, or checks in the margin of the porcelain. Place this partially completed inlay in the cavity and obtain an impression and bite with modeling compound similar to a "mush" bite. After removal from the mouth, flow a film of soft wax over the cavity surface of the matrix and place it in its relative position in the impression. Pour models with plaster and mount on articulator. After removing the modeling compound flow cold water over the inlay to harden the wax and the result will be a perfect imprint of the matrix in wax. The inlay may then be removed and replaced at will and built up with porcelain to exact occlusion and contact.—F. E. CHEESEMAN, *in Review.*

AVENUES OF INFECTION.—Microorganisms, as is well known, enter the body by way of the alimentary canal. Tubercle bacilli enter through carious teeth, the mucous membrane over the tonsils, and probably also through the mucous membrane of the intestine. Typhoid bacilli enter through the wall of the small and large intestine. The streptothrix actinomyces enters by the mouth, especially if there are carious teeth. The embryos of many of the worms enter the body by the alimentary canal. Apart from these, however, it is now believed that many poïsons which get into the body and produce diseases, such as pernicious anemia, malignant endocarditis, acute polyarticular osteo-arthritis, acute infective osteomyelitis, enter by and become absorbed from lesions in the alimentary canal, such as carious teeth, chronic ulceration of the stomach, ulcers in the vermiform appendix and ulcers in the rectum and about the anus.—*Practitioner.*

A WARNING.—Having noticed from time to time that gold fillings and gold crowns which had been nicely finished would come back to me with a dull brassy appearance, some looking as though they had been sand-papered, I began to investigate the cause, and discovered it to be coarse tooth-powders and pastes. I have tested many, and find that about half of those in the market about here are so gritty that they will in a single thorough brushing of the teeth remove all polish from gold, and in a short time cut away exposed cement fillings badly. Some are exceedingly gritty, and without question their use accounts for the deep grooves we often see across labial and buccal surfaces of teeth. In many cases the scratched gold fillings will retain a slimy deposit, making a home for bacteria; just the conditions to lead to decay about their edges. Almost daily I am seeing evidence of the use of these gritty powders, and never fail to find upon inquiry that the patient is using one of the preparations that I have tested and found bad. A fine powder that will keep gold fillings bright and clean will do the same for teeth. I deem it my duty to call the attention of my fellow-dentists to this matter, that they may be on the watch, and may warn

patients for their good, and protect their own work.—N. J. GOODWIN, Hartford, Conn.

SHADING FACINGS FOR GOLD BRIDGES.—In selecting facings for gold crowns or bridges much care must be exercised to obtain the correct shade. This may be accomplished by the use of a piece of gold or platinum held at the back of the facing, as previously explained by Dr. R. L. Graber of Peoria, Ill. If the crowns are all on one side of the mouth, each crown should harmonize with the corresponding tooth on the opposite side, providing that the natural teeth have not been discolored. Teeth in one mouth are not all the same color. A good effect is usually produced by backing the lateral with platinum and the cuspid with pure gold; then the bicuspid facings with platinum. The central may be backed with the metal which seems best suited for the case, and after a little experience the operator can usually determine at a glance which metal to employ. Try this method and note the results.—*Review.*

ABSCESS TREATMENT.—A prolific source of septic pericementitis is escaping microorganisms and ptomaines from putrescent root-canals, but in many instances abscesses may be prevented by the use of proper remedies at the proper time. The first duty is to open the canal, and let the confined gases escape. Both the tooth and the infected peridental membrane require treatment. To aid nature in readjusting the abnormal condition the following prescription will prove useful:

℞—Potass. iodidi,	ʒj;
Syrupi sarsaparillæ comp.,	fʒiij.
	M.

Sig.—Take a teaspoonful three times a day after meals.

The teaspoonful may be added to half a wineglassful of water to further dilute the potassium iodid.—J. P. BUCKLEY, *Dental Review.*

TOOTH-BRUSHES.—I have no use for the soft, mushy tooth-brush sometimes advocated, except in very rare cases. I want a tooth-brush with some backbone to it, with some substance to it. It should be small, but full of good stiff, elastic bristles. Small, to reach every part of the mouth; stiff, to give good stimulating friction to both teeth and gums; straight, not curved, because then best adapted to reach the surfaces on both sides of the arch. It should be used in all directions, vertically and horizontally. The "tooth-pick" idea, associated with the dozen or more little bristles at the end of the curved brushes, does not appeal to me at all. For daily use to remove particles of food, to brush out the softer debris, it is a necessity. In order to keep it in good condition for this purpose and preserve its vitality longer, one should have two or three always in commission for alternate use. As a polisher, however, the tooth-brush is utterly inadequate, because even with the use of a good powder it fails to entirely remove the adhesive deposits, which are so prevalent and so mischievous to the teeth, and there are too many places inaccessible to the brush.—CHAS. B. ROHLAND, *Dental Review.*

PREVENTION OF CHLOROFORM SICKNESS.—Denucé of Bordeaux points out in La Presse Médicale that, in every chloroform narcosis, a by no means inconsiderable amount of chloroform reaches the stomach by reflex acts of swallowing and exerts there an irritating effect, which expresses itself as vomiting during and after the narcosis. He has introduced a plan of making every patient, about to take chloroform, drink a certain amount of water beforehand in order to dilute the chloroform swallowed, and so prevent the irritation and its effect. Beginning an hour and a half before the operation, the patient drinks a glassful of water every half hour, taking the last glass immediately before the administration begins. Four glassfuls are taken, about 28 ounces. The results have been excellent, for not a single patient has vomited, or showed signs of nausea, during or after the operation.

A POSSIBLE DANGER WITH ETHYL CHLORID.—Dr. Amoedo of Paris says that one of his operating assistants having anesthetised the mucous membrane around the upper incisors in a young girl, for the purpose of opening a dental abscess with the thermo-cautery, the ethyl chlorid, on coming in contact with the heated instrument, became ignited. A long flame proceeded from the mouth and set fire to the eye-lashes and hair of the patient.

The assistant, who, fortunately, was not touched, had the presence of mind to throw a napkin instantly over the head of the young girl, and thus extinguished the flame. The patient swooned away, and a lady who accompanied her was quite terrified, and covered the operator with reproaches.

After the excitement of the moment had passed away, it was found that the only damage done was the burning of a few eye-lashes and a few strands of hair. Matters would not have passed off so harmlessly if the flame had injured the eyes of the operator; in that case it would have been impossible for him to have put out the fire about the head of the young girl, who, being insensible, might have been seriously burned.

We think we are rendering a service to our fellow practitioners by making this accident known.

A TOOTH IN THE NASAL CAVITY.—Dr. Schweiburg, in *Zubovratch Vestnik*, states that he was consulted by a woman forty-six years of age regarding a violent headache from which she had been suffering almost uninterruptedly for at least twenty years. The only teeth which remained—the lower incisors and the upper right lateral and central incisors—were seemingly in perfect condition, but there were present in the mouth, apart from the above-named sound teeth, a number of carious roots. At the level of the external wall of the right naris, the mucous membrane was elevated and inflamed, its thinness exposing a white grayish body, very hard and brittle. An attempt at removal, however, was followed by such a profuse hemorrhage that the right nasal cavity was tightly packed and the operation deferred until the following day. The second attempt was successful, the tooth being removed under cocain anesthesia.

It was 18 mm. long, curved at the apex, and was covered all around by a thin lamella of bone, corresponding to the alveolus in a normally erupted

tooth. The crown was cylindrical. It was not possible to determine whether the tooth was a supernumerary or whether it was one of the regular set deviated from its normal direction of eruption into the nose. After operation the headache disappeared.

CHLORATE OF POTASH AS A TOOTH POWDER.—Unna recommends chlorate of potash as a toothpowder, and at the same time as an excellent disinfectant for the oral cavity. The brush is dipped into the powder as into any other powder, and the teeth are brushed lightly, the powder forming a paste with the saliva. Immediately afterwards the mouth is rinsed out with water. For some time a salty taste remains, which is not unpleasant. Unna knows of no other remedy which abates bad breath due to decomposition of food between the teeth and in the pharynx after remaining in the cavities over night. He had many such cases that sought his advice, and all were cured by the above treatment. There are cases, though, where a sore mouth or a fissure becomes very painful if the pure chlorate of potash is used, and in those cases he recommends a paste to be made of carbonate of lime, rad, iridis, soap, and glycerine equally mixed, then add the chlorate of potash to make a 50 per cent. paste.—*Brit. Dent. Jnl.*

WHERE EXTRACTION IS JUSTIFIABLE IN CONNECTION WITH ORTHODONTIC OPERATIONS.—First: Where both the upper and lower teeth on one side of the arch are in normal position and relation, while on the other side we find a canine standing entirely outside of the arch with no space in the arch for its accommodation. In such cases, if the overbite of the upper centrals be normal and the bicuspids and molars on the affected side be in advance of their normal positions but in fairly good occlusion, we believe that the extraction of a first bicuspid would not only be permissible, but would in reality be the best plan to pursue. The shifting of the median line slightly to the side where the extraction has taken place would be of little moment, for it would scarcely be noticeable, and therefore should not deter us from accomplishing that which we could not well otherwise accomplish.

Second: Where the harmony of the features would be satisfactory save for the protrusion caused by both outstanding canines, it is obvious that the extraction of the first bicuspids would be infinitely better than to enlarge the anterior portion of the arch and thus produce an unnatural fulness of the lip. The same may be said of cases where both the upper and lower arches are similarly affected. Under such conditions the extraction of all four first bicuspids would be called for in order to prevent anterior protrusion of both arches.

Finally, it may be said that the orthodontist must decide for himself whether he proposes to base his treatment entirely upon the attainment of the ideal, or whether he will be satisfied in many cases with results less than ideal but harmonious and satisfactory from a practical standpoint. If the former, he may often save all of the teeth but fall short of attaining results that are entirely satisfactory; if the latter, he will occasionally sacrifice a tooth or two in order that the general result may be improved and the patient equally benefited.—S. H. GUILFORD, *Items of Interest.*

VOL. XI. DECEMBER, 1905. No. 12.

The Dental Digest

A MONTHLY SUMMARY OF DENTAL SCIENCE DEVOTED TO THE PROGRESS OF DENTISTRY.

THE OFFICIAL ORGAN OF THE

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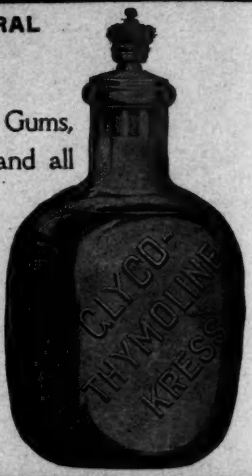

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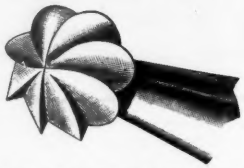

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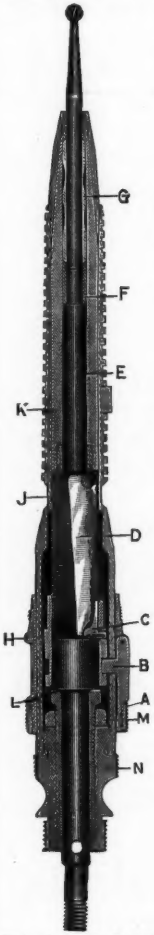

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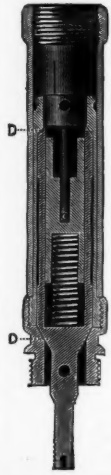

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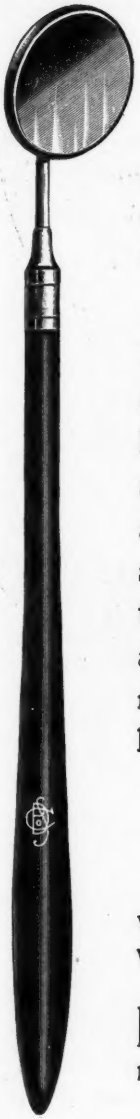
PRICES

College pattern, per pair	$1.00
Perry's " "	.70
Lee's Cross Action, per pair	1.25
Foil Carriers and Plugging Pliers combined, per pair	1.25
Plain, with curved points, short, per pair	.60

FOR SALE BY

Dental Protective Supply Co.

CHICAGO **PHILADELPHIA**



Teeth Reflections

are a most necessary accompaniment of the dentist's profession! Hence the need of a good mirror.

Our dental mirrors are unexcelled. The glass for the lenses is carefully selected and the latter are mounted in heavy german-silver frames, being made as near aseptic as possible. The handles are reinforced where they screw into the socket by means of a threaded metal rod, thus entirely obviating any risk of breakage. Supplied with either plain or magnifying glass and black or white handle.

Sizes as follows:

No. 1, $\frac{9}{16}$ in.	No. 2, $\frac{11}{16}$ in.	No. 3, $\frac{3}{4}$ in.
No. 4, $\frac{7}{8}$ in.	No. 5, 1 in.	No. 6, $1\frac{1}{16}$ in.

PRICES:

With handle, each - - -	$ .65
Without handle - - - - -	.50

Dental Protective Supply Company

1303-6 Heyworth Bldg., 34 Madison St., Chicago
818 Real Estate Bldg., Philadelphia

Impression Trays for Full Cases

These trays are made of heavy aluminum plate, and the handles extend well under the sides and are attached by means of three rivets, thus affording trays with almost as much rigidity as those of Britannia metal. It is conceded that aluminum trays are more cleanly and more adaptable, which facts, added to their extreme lightness, make them particularly desirable. Those trays illustrated above are for full cases, either upper or lower.

PRICE, EACH 25 CENTS

Dental Protective Supply Company

CHICAGO **PHILADELPHIA**

Impression Trays for Partial Cases

These trays differ only from those shown for full cases in that they are for partial dentures. Nos. 7 and 8 are designed for impressions for anterior bridges. Nos. 9 and 10 for either right or left, and upper or lower partial cases. No. 11 is intended for use where lower anterior teeth remain in the mouth. No. 12 is designed for wax bite plate.

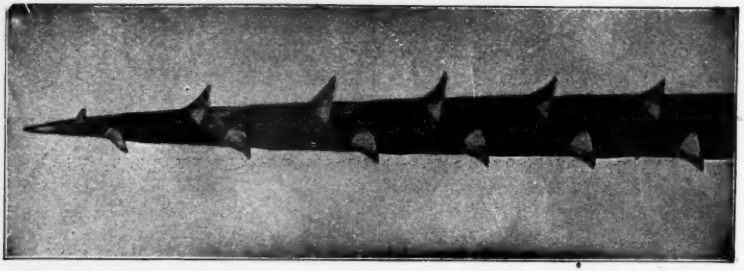
PRICE, EACH 25 CENTS

Dental Protective Supply Company

CHICAGO **PHILADELPHIA**

A Pointed Question

ARE YOU USING FELLOWSHIP BROACHES?



If not, you will find here appended a few reasons why you should:

First—Being made in our own factory they represent Fellowship quality and are therefore the best.

Second—They are made of a specially selected material in the hands of expert workmen.

Third—Well barbed in four distinct rows, every barb retaining its edge and strength indefinitely.

Fourth—Tempered by a special process, they are rendered tough and elastic but without being in the least brittle.

Fifth—Every broach is tested before leaving the factory.

Sixth—They were the first offered the profession at a reasonable figure.

We manufacture in four different sizes, and put them up in packages of six, containing either extra-fine, fine, medium, coarse or assorted.

Price, per dozen $1.00
" " half gross 5.50

Dental Protective Supply Company

1303-6 Heyworth Building, 34 Madison St., Chicago
818 Real Estate Bldg., Philadelphia

FELLOWSHIP
TWIST BROACHES

We have found these broaches to be steadily growing in favor, many practitioners preferring not to use those of the barbed variety. They are made of a particularly tough and yet pliable steel, which allows of being twisted into a spiral form, thus giving a broach which is easily introduced into pulp canals by a rotary motion. By our method of tempering they are practically unbreakable. Another distinct advantage in their use is the fact that they can be used in much smaller canals than is possible with those which are barbed. They are put up in fine, medium, coarse and assorted packages containing one-half dozen.

PRICES:

Per dozen,	for use with any style holder,	$ 1.00
Per half gross,	" " "	5.50
Per gross	" " "	10.00

Also supplied in a short length with thumb hold, for use on molar teeth; per doz., $1.50.

Plain Broaches

These are made of the same material as our other styles of broaches, and are largely used for introducing cotton pellets with medicaments into root canals. We can supply in three styles, plain, roughened, or with hook.

PRICE:

Per dozen, any style, - 75 cts.

MANUFACTURED BY

Dental Protective Supply Company

1303-6 Heyworth Bldg., 34 Madison St., CHICAGO

Branch, 818 Real Estate Bldg., PHILADELPHIA

CEMENT SPATULA

By the use of this spatula all trouble arising from discoloration of cement during mixing is obviated. The instrument is made of a specially treated and tempered steel, not affected by the cement acid. It has a broad, stiff blade, so shaped as to guarantee thorough spatulation, which all cements require, especially Fellowship.

Price, Cone Socket, 50 cents **Price, with Hard Rubber Handle, 75 cents**

DENTAL PROTECTIVE SUPPLY CO. **Chicago, Philadelphia**

FELLOWSHIP CEMENT
It does not shrink, expand nor irritate the soft tissues.
PRICE $1 PER BOX: $5 PER SIX BOXES.
Colors. White, Light Yellow, Yellow, Light Pear
Pearl Gray, Blue Gray. Other colors on demand.
Put up under the personal supervision of Dr. J. N. Crous
MADE ONLY BY THE
FELLOWSHIP CEMENT D.P.S. CHICAGO
FELLOWS CEMEN D.P.S. CHICAG

PLATINUM

foil and sheet, specially soft.
wire, square or round, specially hard or soft for Dentists.
ware of any description.

We Buy and Refine Platinum Scraps.

AMERICAN PLATINUM WORKS

251-255 N. J. R. R. Ave. - - NEWARK, N. J.

SUCCESS

can only be measured by results. The results to be desired where cements are used can **only be obtained with**

FELLOWSHIP

It is the one cement equally valuable whether used as a permanent filling, for the setting of crowns and bridges, or porcelain inlays. In addition to these uses many leading porcelain workers keep it constantly at the chair side as an impression material for inlay cavities. Its density, hardness and entire lack of contraction and expansion make it peculiarly adaptable in all these places.

QUALITY, THE HIGHEST, AND ALWAYS UNIFORM, insuring

RESULTS WHICH ARE ABSOLUTELY DEPENDABLE.

One color boxes only, price $1.00, or 6 boxes, $5.00.

Colors: White, Light Yellow, Yellow, Light Pearl Gray, Pearl Gray, Blue Gray.

Manufactured only by

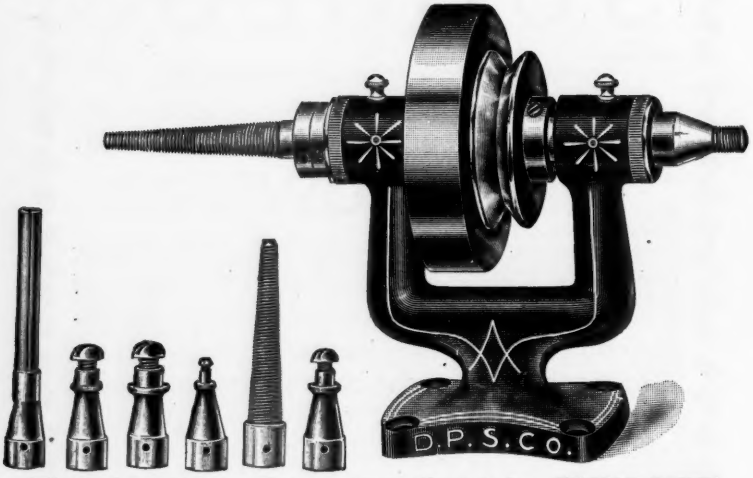
Dental Protective Supply Company,

1303-6 Heyworth Bldg., 34 Madison St.,
CHICAGO.

Branch, 818 Real Estate Bldg., PHILADELPHIA.

Sold by All Reputable Dealers.

THE FELLOWSHIP LATHE HEAD AND CHUCKS



This lathe is made on the cone journal principle. ***IT HAS DUST-PROOF CONE BEARINGS and the CHUCKS ARE SELF-TRUING***

The spindle bearing on right side is fixed, while that on the left is movable, so that any wear may be taken up readily. There is a jamb nut to tighten the movable cone when adjustment has been made and to prevent its working loose.

The dust-proof caps prevent grit from working into the bearings and destroying them.

All chucks are self-truing. The hole in each is conical, so that when screwed onto the spindle shaft the chuck seats itself over a corresponding taper, and is thus held in perfect alignment with spindle.

All polished parts are nickel-plated, while the balance is japanned.

Price, complete, with six chucks, $7.00

Manufactured by

DENTAL PROTECTIVE SUPPLY COMPANY

1303-6 Heyworth Bldg., 34 Madison St., Chicago
818 Real Estate Bldg., Philadelphia.

THE K. WITZEL BUR

Is the best known excavating bur on the market. Everyone is using them. There is a reason for it. We have the only factory in Germany where burs are made entirely by machinery The Germans are the best steel workers in the world. You know what that means. Plain cut, per dozen, $1.50. Cross cut enamel fissure burs, $2.00 per dozen. Write for gross rates.

PINCHES REVELATION CUT BUR

Made in the Witzel bur factory by machinery. Best ordinary cut bur in the world. Chisel blade across head of bur. A beautifully cut instrument. Per dozen, $1.25; cross cut enamel burs, $2.00 per dozen. Gross rates on application.

THE PINCHES COMBINATION BUR

An entirely new shape, designed especially for providing smooth, even undercuts without enlarging the mouth of the cavity. They are sure to please you. Plain, $2.00 per dozen; cross cut, $2.50 per dozen.

ENGLISH TUBE STEEL HYPO. PTS.

With short, razor-edge points. Guaranteed not to break or rust as other needles. Straight, per dozen, $1.00; curved, per dozen, $1.50.

Send $1.00 to-day for a sample line of some of the above specialties. It will pay you. Additional information and prices cheerfully given. Dealers write for trade price list and agency for our goods. We can supply you with almost anything.

C. H. PINCHES

Importer and Exporter of Dental Specialties

1181 BROADWAY NEW YORK, U. S. A.

Dusseldorf, Germany

FOUND!

IN BRINGING **ASCHER'S ARTIFICIAL ENAMEL** to your attention we sincerely believe that we are introducing to the profession the filling material for which they have been seeking for the past half century.

This wonderful production is the life work of one of the greatest German chemists and is being used very extensively by the leading dentists of Europe. He has succeeded in providing the profession with a plastic filling of the same chemical and physical construction as the natural tooth.

It is a well known fact that Germany produces the best dental cement in the world, one of the principal reasons being that the manufacturers use great care in the preparation of the various materials and allow the cement to "age" so that all ingredients are thoroughly mixed. **ASCHER'S ARTIFICIAL ENAMEL** is no exception to the rule. Each batch is under the personal supervision of the inventor, assuring absolute uniformity of material and color. Each bottle has a tag showing the color of the cement when mixed. There can be no mistake.

Ascher's Artificial Enamel is entirely different from any cement known and as it is covered by three patents in this country, there can be nothing "just as good." It is intended for **Permanent Fillings** and the **setting of porcelain inlays.** It will make a filling as substantial as a porcelain inlay in about one-tenth of the time and at a much less expense. The enamel is extremely adhesive and with its use there can be no doubt as to whether the filling will stay in or not. Even in an unpolished condition the filling takes on a translucent and live appearance that is not procured with any other cement and soon becomes as hard as a porcelain tooth. Fillings of this material command the same price as gold and porcelain inlay fillings.

Recalling a cement which appeared on the market a few years ago, for which much was promised, I can positively assure you that **ASCHER'S ARTIFICIAL ENAMEL** is **entirely different.** All we ask you is to try a sample, and when fully satisfied that it is all we claim for it, send for a box. My business depends entirely upon wholesaling and retailing this cement and a few other specialties, and it would not pay me to ruin my business reputation by selling an article unless it was all right.

This material must not be unneccessarily exposed to the air, or it will disintegrate and the fillings crumble away. On this account we must positively refuse to exchange any of this material after the seal has been broken.

To procure best results with any cement, particularly **ASCHER'S ARTIFICIAL ENAMEL**, it is poor policy to use a metal spatula. We have secured some very substantial spatulas cut from pure ivory, that will last a lifetime with ordinary care and which are most essential to any well appointed dental office.

Prices of Ascher's Artificial Enamel

Small sample, any shade, enough for several fillings	**$ .50**
Sample box, 1 powder, 1 liquid, 1 dropper, any shade	**4.00**
Large box, 6 colors, shades 1 to 6, 3 bottles liquid, 3 droppers	**20.00**
Very large box, 6 colors	**40.00**
Pure Ivory Spatulas	**$2.00 and 1.50**

This esamel can be procured at any dental depot or will be sent prepaid upon receipt of price. Further information and testimonials cheerfully furnished upon application.

Sole Agent United States and Canada

C. H. PINCHES

IMPORTER AND EXPORTER OF DENTAL SPECIALTIES

1181 BROADWAY, New York City **DUSSELDORF, Germany**

Witzel Burs-"Pinches" Burs. Stabilist Handpiece. Harvard Broaches. Hugo Ascher's Artificial Enamel. English Tube Steel Hypo Needles. Dr. Fd. Ph. Klein's Plastic Dentine, etc., etc.

SEE FOLLOWING PAGE.

A FREE SAMPLE

OF

Ascher's Artificial Enamel

IMPROVED

On account of the great cost of these samples we can supply only those dentists who have not yet tried the material. The amount is limited to one sample for each dentist. Fill out the attached coupon and mail to your dealer or direct to us.

Date_____

C. H. PINCHES,
1181 Broadway, New York.

I have never used Ascher's Artificial Enamel and would like you to send me a sample as near as possible to shade_____. My regular dealer is _____

_____

_____

WHAT SANITOL IS

Sanitol is a true antiseptic (1 to 38 parts), highly oxidizing, neutral in reaction, and possessing, because of its ingredients, wonderful therapeutic, oxidizing and prophylactic powers. Sanitol prevents, destroys and protects from oral diseases; and is a cleanser, deodorizer, sterilizer and counteractant.

FORMULA OF SANITOL

Salitrol, Limocine, Formol, Plantago, Majorum, Menthol, Spirits of Cologne.

A combination of ingredients, scientifically compounded to meet the advanced demands of dental prophylaxis.

SANITOL
TRADE MARK
BEST FOR THE TEETH

HIGHEST AWARD

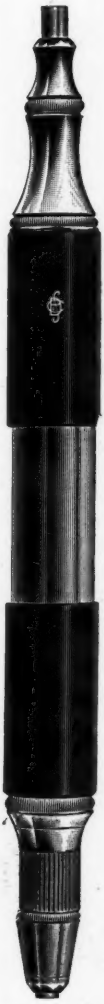
After 8 years of test by the dental profession, Sanitol is recommended by 85 per cent of the dentists of America as the best. At the Louisiana Purchase Exposition all the Sanitol preparations received the Gold Medal, the highest award ever given.

MEETS MODERN DEMANDS

It is a day of progress in Dentistry. No practitioner can afford to use or prescribe old preparations, compounded from antiquated formulas which met the demands of thirty years ago. Sanitol is ***the Modern preparation,*** tested by scientists and the profession; has met every claim made for it, and today stands Head and Shoulders in value above all others.

The Sanitol Chemical Laboratory Company, St. Louis.

MALLETING



by hand has lost much of its vogue in recent years. This fact may be largely attributed to the perfection now reached in the manufacture of mechanical mallets, notably those known as "automatic."

By the use of such an appliance a marked saving of time is effected without lowering in any sense the standard of the work done.

IN THE

Fellowship Automatic Mallet

we draw attention to an appliance which we consider second to none. The construction is simplicity itself, the direct and pull strokes being governed by the same mechanism. All the working parts are carried by the spindle, which reduces the friction. All those parts subject to wear are made of hardened steel. The workmanship throughout is the very best. The mallet gives a uniformly dead blow, the force of which may be varied to suit the needs or wishes of the operator. The adjustment to regulate this is made by turning a knurled thimble at one end.

Both ends are drilled to hold either the cone socket or automatic plugger points. The "grip" on either end is covered with black hard rubber.

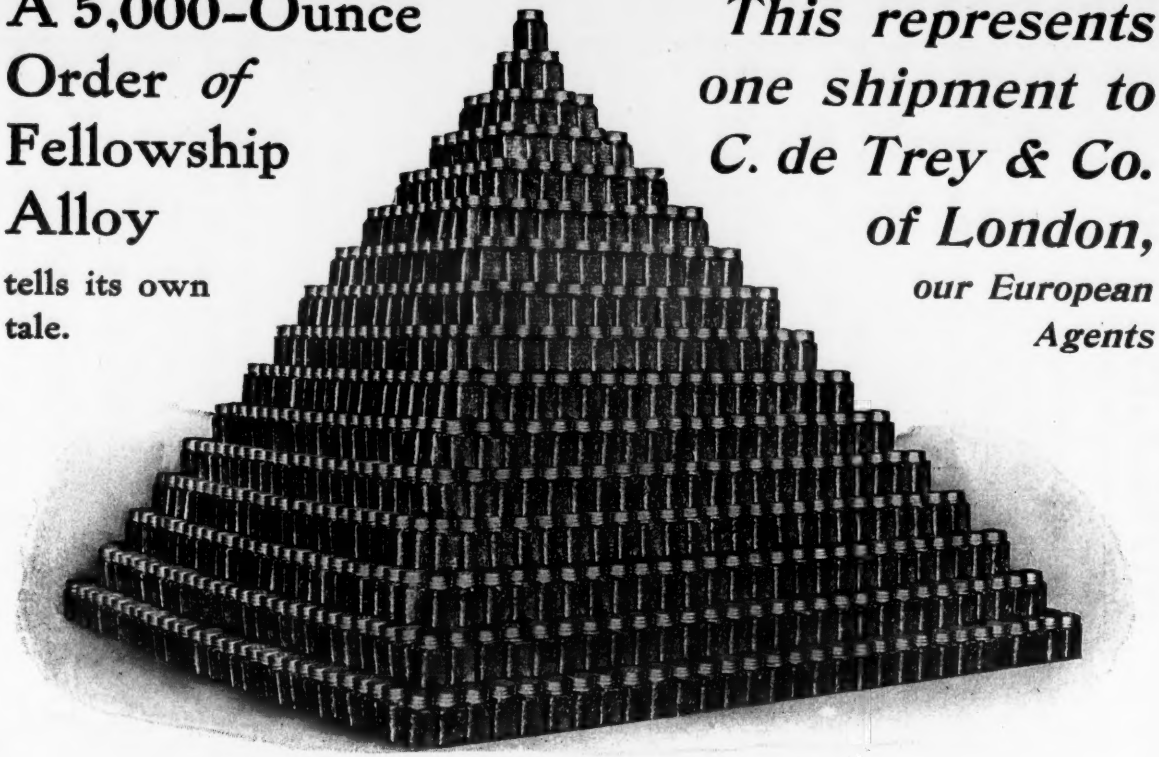
PRICE, $6.00

Dental Protective Supply Co.

CHICAGO PHILADELPHIA

A 5,000-Ounce Order *of* Fellowship Alloy

tells its own tale.



This represents one shipment to C. de Trey & Co. of London,

our European Agents

JUST ONE OUNCE

OF

FELLOWSHIP ALLOY

will bring immeasurable satisfaction to you and your patients.

FELLOWSHIP WAS THE ORIGINAL TESTED ALLOY.

That is, it was the first offered the dental profession for which the claim could be made that it would not contract, but would show a slight expansion ($\frac{1}{2000}$) and always maintain its color, contour and edge strength.

It was made so at that time and has been the same in every particular from that day to this; in other words, FELLOWSHIP is the one absolutely uniform alloy and always will be.

Price, per ounce, $3.00; 5 ozs., $12.50; 10 ozs., $22.50; 20 ozs., $40.

MANUFACTURED SOLELY BY THE

Dental Protective Supply Company

1303-6 HEYWORTH BUILDING
34 MADISON ST., CHICAGO

BRANCH: 818 REAL ESTATE BLDG., PHILADELPHIA

Operative Instruments

Should have expert attention at regular intervals. Burs need recutting and stoning. Pluggers require reserrating. Excavators and other edged instruments should be overhauled and either repointed or sharpened.

¶It is for such work as the above that we maintain a special department at our factory, and note a steadily increasing demand for the services of our repair experts.

¶It must be conceded that it is better to have a small selected line of operative instruments, in perfect condition for all demands, than an extended outfit the greater portion of which is dull-edged and affords but indifferent satisfaction.

PRICES

Cavity Burs, Recut and Stoned	*Per doz., $0.50*
In six-dozen lots	*" .45*
In twelve-dozen lots	*" .40*
Finishing Burs, Recut and Stoned	*" 1.00*
Excavators Repointed	*Per doz., 75c to 1.00*
Pluggers Reserrated	*Each, 15c to .25*
Mirrors Reglassed	*Each, .50*

Being manufacturers of Handpieces, we are equipped to make a specialty of Handpiece Repairing

To save time send to us direct at Chicago office, and if you so desire we will charge through your own dealer

Dental Protective Supply Company

1303-6 Heyworth Bldg. 34 Madison St., CHICAGO

Branch: 818 Real Estate Bldg., Philadelphia

LITTLE THINGS

THAT WILL HELP YOU DO GOOD WORK

COPPER-CARBO CUTTERS—Used with Copper-Carbo Powder, for cutting, grinding and trimming natural and artificial teeth.

DISK FORM—Especially desirable for preparing roots for shell crowns. 60 cents the set of eight, by mail.

LONG SHANK—For trimming cavity margins, etc. 15 cents each by mail. Copper-Carbo Powder, 15 cents the jar.

MAGIC CLASP NAPKIN HOLDERS — Neat, quickly adjusted. No. 1, 15c; No. 2, 25c, by mail.

PULLENS SOLDERING CLAMPS—Light and delicate. Designed by an expert in gold soldering. Set of two for crowns, 30c; set of five for orthodontia appliances, $1.00, by mail.

LEWIS BENCH BLOCK—For filing gold and rubber work. Adjustable in any direction. Applicable to any work bench. 75c, by mail.

INSTANTANEOUS WATER HEATERS—To furnish hot water instantly for all laboratory and operating room purposes. $5.00 to $25.00.

Catalogue "A" describes these and many more "Little Things That Help."

WANT A COPY?

Buffalo Dental Manufacturing Co.

BUFFALO, N. Y., U. S. A.

Makers of Buffalo Specialties. **Quality Unsurpassed.**

A Post Graduate Course Free

At the Auditorium, Chicago, Ill., March 27, 28, 29, 30, 1906, there will be offered a practical Post Graduate course which will be free to all dentists. Continuous demonstrations of standard and new appliances and of methods new and old will be offered by experts. There will be no theoretical papers, but highly trained men will be numerous.

The occasion will be the second Dental Manufacturers' Exhibit, where every prominent dental manufacturer will exhibit and demonstrate his wares. Since these include practically everything used in dentistry, the demonstrations will cover nearly the entire field of practice.

There will be chairs, engines, lathes, cuspidors, cabinets, anesthetics and anesthetic appliances, golds, alloys, cements and porcelains and the various methods and appliances for using them. The various medicinal remedies used in practice will be demonstrated and their actions clearly explained. All the modern methods of applying electricity, water and compressed air to the practice of dentistry will be clearly shown. Teeth, facings and crowns will be present in all their manifold forms and the thing you want to know about them will be clearly explained.

Each line will be demonstrated by experts, who will take courteous and intelligent interest in your difficulties and will help you solve them. The demonstrations will be continuous and you may pause where you like as long as you wish.

This is a repetition, on a larger scale, of the Dental Manufacturers' Exhibit held in Philadelphia, March, 1903, which was attended by dentists from far and near. It was voted the most complete, interesting and instructive dental exhibit ever held. You'll miss a rare opportunity if you miss this exhibit. Details in these pages later.

Auditorium, Chicago,

March 27, 28, 29, 30, 1906.

THE MEDICO-CHIRURGICAL COLLEGE
OF PHILADELPHIA

DEPARTMENT OF DENTISTRY

The Fees for this Department Have Not Been Raised for the Session of 1905-06

As a distinct part of the Medico-Chirurgical College the Department of Dentistry offers superior advantages to its students. The clinics of the college present wide opportunities for the practical study of general and oral surgery, as well as supplying abundance of material for practical work in the Dental Infirmary. All of the privileges of the students of the Medical Department of the college are accorded to dental students. A complete system of quizzing conducted by the professors free of charge, obviating the expense of private quizzing and preparing the students for examination. Illustrated catalogue describing courses in full and containing all information as to fees, etc., sent on request to

ROBERT H. NONES, D.D.S., Dean, 17th and Cherry Sts, Phila., Pa.

Watt's Metal or Fusible Alloy

DENTAL PROTECTIVE SUPPLY COMPANY
WATT'S METAL

A large number of successful dentists are to-day using Watt's Metal for their plate work, and this class of denture is growing in favor with both profession and public.

Plates so made are strong, cleanly, and especially adapted to lower cases where weight is a necessary feature. It is further claimed that a better fit may be obtained than with either rubber or celluloid, and after years of use and exposure to the mouth secretions the denture shows no change in either structure or color. Plates may be made entirely of the metal or on the combination principle of Watt's Metal base and either rubber or celluloid attachment.

Another advantage is that by its use the practitioner is enabled to obtain a considerably higher price for a denture than is possible where rubber or celluloid only is used.

Price, Per Ingot, 50 Cents

MANUFACTURED AND FOR SALE BY

Dental Protective Supply Company

CHICAGO - - - PHILADELPHIA

The Perfection Portable Chair

(PATENTED.)

This Portable Chair is the best attainable. It is strong and light.
Any position necessary in the practice of dentistry readily obtained.
The Head Rest is quickly and easily adjusted.
The raising and lowering mechanism is a triumph—the patient in the chair.
It is easily folded in a compact shape.
The Base of the Chair is not in the way of the Dentist.
The Chair Seat is 17 inches wide.
It is furnished with Spittoon and Holder when ordered.
This Chair also fills a long felt want for the busy office dentist who needs another for examinations. A Perfect Chair like this will help you get busy. Send for circulars.

Price $18.00 Spittoon and Holder extra..$1.50 Trunk extra..... 5.00

For sale by all dealers and

THE WALKER BROWNE DENTAL CO.
1216-1217 Century Building, Atlanta, Ga.

Farrar's Great Work Cyclopedic Irregularities of the Teeth

And Their Correction.

BY JOHN NUTTING FARRAR, M. D., D. D. S., New York City.

"Unquestionably the most practicable work upon the subject attempted in this century, and it is doubtful if it can be improved upon in the next."—*International Dental Journal.*

SOLD BY INTERNATIONAL NEWS CO., 83 Duane St., New York City, Bream's Buildings, Chancery Lane, London, England, 18 Stephanstrasse, Leipzig, Germany.

Price of Each Volume: In full cloth, **$4.00**; in cloth sides, morocco back, **$5.00**; in sheep or half morocco, **$6.00.** Vol. III, when out (soon), same rates.

Folded

THE McConnell Dental Chair.

DOCTOR:—Why not increase your practice and your income by using one of those "McConnell Dental Chairs?" It's so handy and just as easy as sliding down a rainbow, and it will not rupture your finances when purchasing one. **$16.50 is all I ask for them,** and they can be elevated from 17 inches to 38 inches, and adjusted from an upright to a reclining position while occupied. Head-rest has front, back and side movement. Guaranteed in every respect. Write for catalogue.

J. W. McCONNELL, D. D. S.,
Patentee and General Agent, CORNELIA, GA.

PETERSON'S

MATRIX

50 IN A BOX—50c.

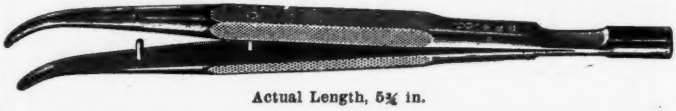
Self-Retaining
Flexible
Transparent
Helps to Make Filling
Saves Time

Good work with plastic materials cannot be easily done without a matrix. Peterson's is the nearest all around one. Easily adjusted—can be instantly removed without disturbing filling.

FOR SALE BY ALL DEALERS. If not, by

C. J. PETERSON, D. D. S. **DUBUQUE, IOWA**

BRONSON PLIERS



Actual Length, 5¾ in.

These Pliers are made heavier than ordinary Pliers and will be found most useful instruments in practice for:

- Inserting and removing wedges.
- Removing small roots and loose small teeth, avoiding use of forceps.
- Removing scraps of split teeth hanging on the gum
- Inserting and removing matrices.
- Pulling off tight bands in making pivot teeth or gold crowns.
- Removing temporary fillings.
- Removing and inserting pivot tooth pins.
- Removing loose metal fillings from the mouth where ordinary pliers would slip.

We have enumerated above only a few of the uses this desirable instrument can be put to.

Nickel-Plated, Price $1.50

DENTAL PROTECTIVE SUPPLY CO.

CHICAGO **PHILADELPHIA**

It is a matter of health

℞

SANITOL

TRADE MARK

BEST FOR THE TEETH

There is no substitute

PATENTS

Caveats, Trade Mark, Design-Patents, Copyrights, Etc.

CORRESPONDENCE SOLICITED

JOHN A. SAUL,

Fendall Building. - Washington, D. C.

SAL HEPATICA

The original effervescing Saline Laxative and Uric Acid Solvent. A combination of the Tonic, Alterative and Laxative Salts similar to the celebrated Bitter Waters of Europe, fortified by addition of Lithium and Sodium Phosphates. It stimulates liver, tones intestinal glands, purifies alimentary tract, improves digestion, assimilation and metabolism. Especially valuable in rheumatism, gout, bilious attacks, constipation. Most efficient in eliminating toxic products from intestinal tract or blood, and correcting vicious or impaired functions.

Write for free samples.

BRISTOL-MYERS CO.,
Brooklyn, New York City.

Please mention the DENTAL DIGEST when writing to advertisers.

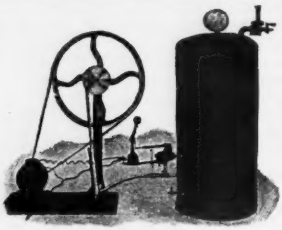
Pointed Screws. Three Sizes.

PLATINOID CROWN PINS.

You can save any kind of a root, and make it useful for a gold crown, by strengthening it with a Crown Pin. They are tapering, with a deep cut thread, and will cut their way into tooth-structure, making a solid foundation to build amalgam or cement around. They can also be used as posts for Richmond and other crowns, as the thread on the pin holds the cement. They are non-corrosive, will not discolor gold. Platinoid Crown Screws are superior to gold screws, as the metal is harder. They can also be used to anchor gold or amalgam fillings, extract roots, etc. We manufacture twenty specialties from Platinoid. Send for new catalogue.

$1.00 per dozen. All dealers keep them. Send to

MANHATTAN DENTAL CO., **New Times Bldg., Broadway and 42d St., New York.**



Air Pumps and Automatic Electric Compressed Air Outfits

Write for catalogue. Our outfits are noiseless. In writing please mention current used. We also sell **Hydraulic** and **Hand Air Compressors.** Write for prices on **Lathe Motors,** direct or alternating current.

MARTIN & ANSON CO.
MANUFACTURERS
2226 Indiana Avenue - - CHICAGO

"THE BEST STRIP MADE."

Dr. Howard's Dental Finishing Cloth Strips.

FIRST AND FOREMOST IN THEIR LINE
FOR FOURTEEN YEARS.

Made in four grits—Coarse, Medium Coarse, Medium, Fine, and in three widths—Broad, Medium, Narrow. Put up mixed or separate, as desired, in boxes containing an amount equal to one gross, of medium width, seven inches long. Send for them if your dealer does not keep them.

Manufactured only by

CHAS. T. HOWARD, ROCHESTER, N. Y.

PYO-PLASTIC

THE POSITIVE PULP-CAPPER AND ROOT-FILLER.

Easily Applied with lasting effect.

Destroys Pyogenic Micro-Organisms and prevents their formation.

IN USE OVER SIX YEARS

Full directions accompany each package.

Sent prepaid on receipt of price, **One Dollar.**

Brown's Celebrated *CLEANING FLUID*

Quickly removes Green Stain, Black Tartar and Tobacco Stain from the Natural Teeth Without Injury to the Enamel or Live Tissue.

Full directions accompany each bottle.

Sent prepaid anywhere on receipt of price, ***FIFTY CENTS.***

SPRINGFIELD DENTAL DEPOT

DENTAL SPECIALTIES

68 BRIDGE STREET ***SPRINGFIELD, MASS.***

A NEW IDEA, war on large tooth brushes. Four sizes, Larger Adult in two grades, M. S. or S., Smaller Adult, Child's and Smallest, one grade only. See ad. in January, February, March and April Digest. Send $1.00 for the five sample brushes. Send for literature.

D. M. CLAPP, Sole Owner, Box 193, Back Bay, Mass.

The One that Satisfies.

Feels safe in using WAITE'S.

I like Dr. R. B. Waite s Local Anaesthetic. I feel that I run no risk to my patients or myself in using this preparation. I have great confidence in its antiseptic virtues.

DR. R. E. WARE, Shelby, N. C.

One of the many from Canada.

I can say with emphasis that Dr. R. B. Waite's Local Anaesthetic is the best after twenty-five years' practice, during which time I have tested about everything on the market.

DR. J. F. GUERIN, Whitewood, N. W. Ter.

Indispensable as Gold.

I have been using Dr. R. B. Waite's Local Anaesthetic for years and have yet to meet with the patient who finds fault. It is as indispensable as gold in my practice.

J. W. MCVICAR, D. D. S., North Branch, Mich.

Gums Heal Like Magic.

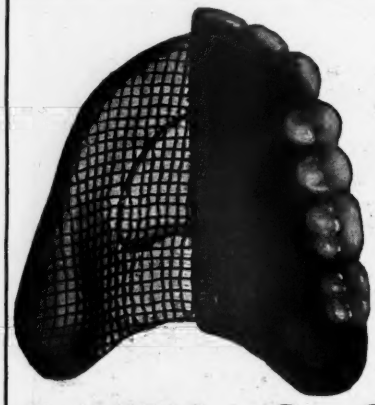
I can honestly say "Dr. R. B. Waite's" is the only perfect Anaesthetic of all that I have ever used. Not a single case of sloughing or toxic effect whatever. I have extracted over fifteen teeth for different ladies at one sitting and their gums healed like magic. I feel I could not practice without it.

DR. W. H. O'BANNON, Brewton, Ala.

The Antidolar M'f'g. Company,

Springville, Erie Co., N. Y.

At Depots or from the M'frs.



We always have been and we **ALWAYS** will be **ON** top because **THE** dentists prefer **SQUARE** dealing and know where to get it.

SAM'L G. SUPPLEE

874 Broadway, NEW YORK

CROWNS - BRIDGES - PLATES - REGULATING

MORE CASH FOR OLD GOLD

We Will Give You More in Cash

for your Gold and Platinum scraps and filings than you can get for it in trade.

We have been smelting and refining for twenty-two years, do a very large business and have the most improved and economical facilities for handling Old Gold, Platinum, bench sweeps, etc.

YOU TAKE NO RISK.

We send draft on receipt of every shipment, small or large, and hold same in its exact condition until we hear whether the amount is up to your expectations; if not, we return it, express prepaid. Could any proposition be fairer?

We are sure that if you send one shipment you will send them often.

You can also send us the accumulation of rubbish around your work-bench if you think it contains any gold, and we will give you its value in cash after deducting our small refining charges.

Two Large Refineries.

WENDELL & CO.

93-95-97 William St., NEW YORK. **57 Washington St., CHICAGO.**

THE BROWN & DEAN CO.

102 and 104 Richmond Street,

PROVIDENCE, R. I.

Gold and Silver Refiners and Assayers

We refine everything containing Gold or Silver. Our charges are reasonable and our returns prompt and satisfactory

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We Send Samples

Because Our Goods Stand on Their Merits

When every Dentist who tries it **says so, it must be so**
(That's the best proof)

That Dr. Gilmore's Excel Aseptic Anæsthetic

is the **best** on the market. **No matter what anæsthetic you now buy, try Dr. Gilmore's Excel; you will say it is best and continue to use it,** as others have. **Price,** 2-oz., $1.50; 6-oz., $3.60; 10-oz., $5.00.

We give formulas with all of our preparations

ABCESQUE cures all abscesses and is a fine root-canal filling. **PULPINE** saves pulps, stops hemorrhages and after-pains. **EXCEL DEVITALIZING PASTE** devitalizes painlessly. **LOCALINE** is a local anæsthetic applied to the gums (on cotton). **OBTUNDINE** for immediate obtunding of sensitive dentin. **EXCEL GOLD STARTER** for starting gold fillings without retaining pits. All these are $1.00 each. Ask your dealer or send to us.

EXCEL CHEMICAL COMPANY

2228 Fulton Street **BROOKLYN, N. Y.**

DR. VEO'S REMEDY

FOR PYORRHEA ALVEOLARIS

OBTUNDENT, HEMOSTATIC AND GERMICIDE

DR. VEO'S REMEDY has no rival, and cannot be Imitated

USED

TO STOP BLEEDING IMMEDIATELY
BEFORE removing any DEPOSIT from the TEETH
BEFORE adjusting the RUBBER DAM, CLAMPS or LIGATURES
BEFORE removing any DECAY from CAVITIES
BEFORE cleaning out the ROOT CANALS of all PULPLESS TEETH
BEFORE excavating a SENSITIVE TOOTH
BEFORE preparing TOOTH or ROOT for CROWN

READ WHAT OTHERS SAY

September 23, 1904.

DR. S. H. GUILFORD,
Phil. Dental Col., Philadelphia, Pa.

I am pleased to state that **we obtained good results** from use of **DR. VEO'S REMEDY** in our college clinic last year, and no doubt shall again.

November 1, 1904.

DR. V. J. BAGGOTT,
524 Westminster St.,
Providence, R. I.

I have used about all the preparations on the market, but some **5 years ago**, very luckily, ran into **DR. VEO'S REMEDY.** I have used it ever since, and **am delighted with the results.**

November 9, 1904.

DR. K. L. CLEAVES,
Montpelier, Vt.

I find **DR. VEO'S REMEDY** all that you claim for it. I use it principally **as a hemostatic, at which it has no equal.**

December 1, 1904.

DR. G. P. WIKSELL,
Hotel Pelham, Boston, Mass.

I have used **DR. VEO'S REMEDY** for **over 5 years** at the rate of **12 bottles a year** and regard it as one of my greatest helps **in treatment of chronic abscess** and pus pockets in PYORRHEA. As a styptic after extracting it is also a great help, preventing swelling and soreness. **I have discarded all other treatments for Pyorrhea.**

A real genuine testimonial is a true index of value, and I never publish anything else

Full directions accompany each bottle
Sent postpaid on receipt of price

PRICE PER BOTTLE, $2.00

PREPARED ONLY BY

Charles H. Veo, D. M. D.

74 Boylston St., Boston, Mass., U. S. A.

ASK YOUR DEPOT FOR "WILLIAM DIXON'S"

New Improved Bristle Disks

THEY RUN ABSOLUTELY TRUE
THEY HOLD THE PUMICE

THEY ARE "ACKNOWLEDGED" THE BEST

FIG. 6014 "Stiff"

FIG. 6015 "Soft"

FIG. 6016 "Stiff"

FIG. 6017 "Stiff"

½ DOZEN DISKS ON A CARD (ANY STYLE) FOR 50c NET

IF YOUR DEPOT CANNOT FURNISH THESE SEND TO US

F. W. GESSWEIN COMPANY, Sole Man'frs

39 John Street - - - NEW YORK CITY

GOODRICH DENTAL DAM

MADE BY THE OLD RELIABLE PROCESS

No new wrinkles, no special features. Just good, plain dental dam made from the best rubber and by people who know how.

Sold under the strongest kind of guarantee.

THE B. F. GOODRICH COMPANY

AKRON, OHIO.

NEW YORK, 66-68 Reade St. and 1625 Broadway.
CHICAGO, 141 Lake St.
SAN FRANCISCO, 392 Mission St.
BOSTON, 157 Summer St.
PHILADELPHIA, 922 Arch St.

YOU NEVER CAN TELL

if cocain won't make the patient nauseous, nervous, faint.

Beta-Eucain

IS SAFE AND SURE

It NEVER causes by-effects if ASEPTICALLY injected.

Its solutions keep INDEFINITELY and can be BOILED.

Endorsed by foremost dentists and surgeons.

LITERATURE FROM

Schering & Glatz 58 Maiden Lane **New York.**

Bleaching
Sterilizing

SAPONIFYING DEODORIZING

Na_2O_2

DENTAL SODIUM DIOXIDE

in 2-oz. tins at 75c. del'd from dealers, or

The Roessler & Hasslacher Chemical Co.

100 WILLIAM STREET, NEW YORK

DR. KIRK, Dean of U. of Pa., writes: *"We have found it invaluable not only for bleaching discolored teeth but in the treatment of putrescent and infected conditions of the pulp canal."*

DR. HAMILTON'S

Ideal Pulp Capping Obtundent

It has no equal as a pulp capping. Painless, simple, easily applied. It will stop pain from exposed pulps or sensitive dentin immediately. It lasts much longer and goes much farther than any other preparation in use by the profession. Has been used for years, and is endorsed by some of the best men in the dental profession. Send for testimonial of hundreds. Try it.

Price, $1.50.

Sent by mail on receipt of price.

DR. J. C. M. HAMILTON

114 Seventh Avenue, • • Beaver Falls, Pa.

THE PEER OF LOCAL ANESTHETICS

ALVATUNDER

HIGHEST AWARD AT ST. LOUIS

"SOLD 'ROUND THE WORLD"

BY GOOD DEALERS AT THE FOLLOWING PRICES

1 OUNCE	$ .75.
2 OUNCE	1.50.
10 OUNCE	5.00.

MANUFACTURED ONLY BY

THE HISEY DENTAL MFG., CO.

ST. LOUIS, U.S.A.

"It didn't hurt a bit!"

WHY?

His Dentist gave him

"Antikamnia & Codeine Tablets"

When to Use Them

FIRST

To ease the nagging and shooting pains while operating; to quiet the nerves, and prevent the headaches and nausea which frequently follow operations, administer one Antikamnia & Codeine Tablet every hour. Give one before beginning operation

SECOND

One Antikamnia & Codeine Tablet given before and another one after extracting a tooth, will stop pain and allay irritability

THIRD

When a painful cavity exists, or a nerve or root is exposed, administer internally one or two Antikamnia & Codeine Tablets and fill the cavity with the powdered tablet, or apply it freely about the gums

FOURTH

For toothache, earache and facial neuralgia, administer one Antikamnia & Codeine Tablet every two hours until relieved

FOR SAMPLES AND LITERATURE, ADDRESS

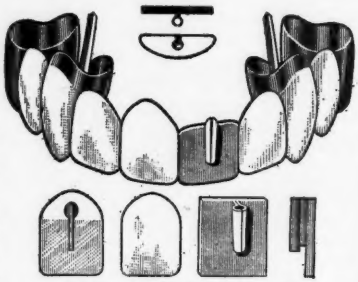
The Antikamnia Chemical Company St. Louis, Mo., U. S. A.

Try STEELE'S

Interchangeable Tooth

For Crowns and Bridgework

On That Pin Facing Case That is Bothering You With Frequent Breakages



Pat. U. S., Canada, Great Britain, France

Hundreds of our patrons were convinced of its strength and many virtues by this test.

All such cases show either a stoppage of breaks or a material decrease in the frequency of them.

Don't wait for a favorable case; try it on your worst.

They Won't Break if Properly Applied

"Properly applied" is not an evasive technicality, but can be summed up easily as follows:

Proper occlusion.

Keep the face of the backing virgin clean of solder and other foreign substances.

Protect the facing by trimming the backing flush with the incisal edge.

Preserve the thin cutting edge of the facing, avoiding blunt ends.

Nothing difficult in such rules of conduct; we have yet to find a case where these points were observed and trouble resulted.

WHAT IF THEY DO BREAK, you can renew (not repair) the tooth in ten minutes.

SIMPLE AND EASY TO MANIPULATE. SAVES TIME BY DOLLARS' WORTH. NO SPECIAL EQUIPMENT REQUIRED.

PRICES:

Facings, 20 cents each; Platinum Alloy Backings, 30 cents each
Gold Backings with Platinum Alloy Posts, 60, 70 and 80 cents, according to size
Gold Backings with Gold Posts, 90c, $1.00 and $1.10

Booklet on application. Sold by dealers. If yours has not placed them in stock, write us.

The Columbus Dental Mfg. Co.

751 E. Long Street, COLUMBUS, OHIO

Western Branch:
126 State St., Chicago, Ill.

Elliott & Co., 30 Hanover St., Edinburgh
Agents for Great Britain

A FEW OF

The Kotts' Specialties

No. 1. Obtundall for Sensitive Dentine. This is certain in its work and can always be relied upon. Will absolutely not injure the pulp. It absolutely destroys all pain while excavating. It is to be applied to the cavity. Your money cheerfully refunded if not entirely satisfied. Price, **$10.00** for 600 to 800 treatments.

No. 2. Kotts' Antiseptic Nerve Canal Points are so medicated and thoroughly incorporated with Iodoform-Creasote and other of the best antiseptics, that when placed in nerve canals they render them perfectly sterile for ever after, and should always be used instead of plain points. We make both medicated and plain, and of white and pink gutta-percha. They are round, hand made and are put up in the following forms—Large, Fine and Assorted.
Medicated, per box of 150....**50c.** Plain, per box of 150....**25c.**

No. 3. Mumaline. For mummifying freshly devitalized nerves and filling roots; thereby mummifying fragments of nerves that can not be removed. It contains no glycerine, but is prepared with essential oils and thoroughly incorporated with some of the pine gums, making it absolutely impossible for moisture to enter nerve canals filled with it. Price, per box, **$1.00.**

No. 4. Paraforma, an Abscess Cure. Price, **$1.00.**

No. 5. Kotts' Tin Cement for Children's Teeth. It lasts four or five times as long as Oxyphosphate. Price, **$1.00.**

No. 6. Kotts' Crown and Bridge Cement. Two colors. **$1.00.**

No. 7. Zenobia Gold Alloy 66 + Silver. One ounce, **$2.00.** Five ounces, **$7.50.** Seven ounces, **$10.00.**

Zenobia White Alloy. One ounce, **$1.00.** Five ounces, **$4.75.** Ten ounces, **$9.00.**

No. 8. Kotts' Local Anesthetic. Contains no cocaine nor eucaine. **50c.** per ounce.

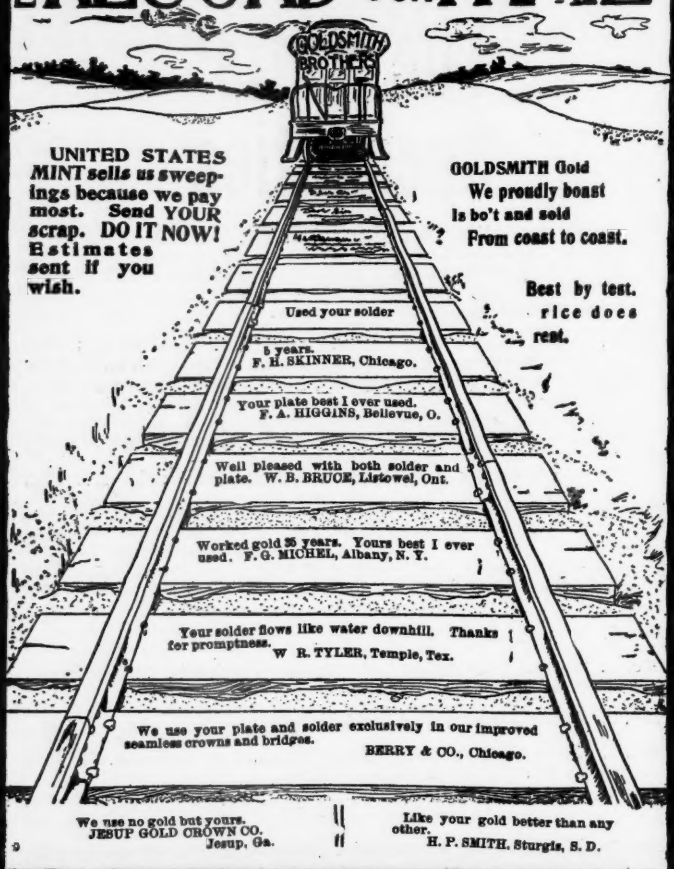
If any of the above articles do not give perfect satisfaction your money will be cheerfully refunded. Order from your dealer or direct from

FRED A. KOTTS, D. D. S.,

REFERENCE—Any Bank in Toledo, Bradstreet or R. G. Dun.

518 Spitzer Bldg., Toledo, Ohio

THE RECORD ON OUR TRAIL


GOLDSMITH BROTHERS
UNITED STATES MINT sells us sweepings because we pay most. Send YOUR scrap. DO IT NOW! Estimates sent if you wish.
GOLDSMITH Gold
We proudly boast
Is bo't and sold
From coast to coast.
Best by test.
rice does
rest.
Used your solder
years.
F. H. SKINNER, Chicago.
Your plate best I ever used.
F. A. HIGGINS, Bellevue, O.
Well pleased with both solder and plate. W. B. BRUCE, Listowel, Ont.
Worked gold 35 years. Yours best I ever used. F. G. MICHEL, Albany, N. Y.
Your solder flows like water downhill. Thanks for promptness.
W R. TYLER, Temple, Tex.
We use your plate and solder exclusively in our improved seamless crowns and bridges.
BERRY & CO., Chicago.
We use no gold but yours.
JESUP GOLD CROWN CO.
Jesup, Ga.
Like your gold better than any other.
H. P. SMITH, Sturgis, S. D.

WE HAVE MANY TESTIMONIALS FROM MANYWHERE—

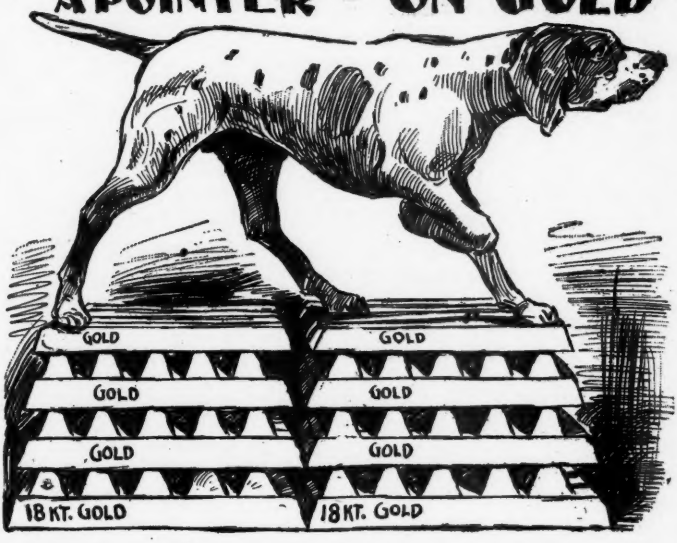
Canada and every state in the Union—which convinces us that if our products were but given a fair trial we would have

MANY TESTIMONIALS FROM EVERYWHERE.

Samples of gold solder and other specialties free to any dentist. Write on your office stationery or enclose card.

GOLDSMITH BROS., ASSAYERS, REFINERS, MANUFACTURERS,
63-65 Washington St., CHICAGO, U.S.A.

A POINTER - ON GOLD.



GOLD PLATE This should be absolutely free from flaws, uniform in gauge and fineness, soft and pliable, of good color, and last, but not least, the price must be right. Our plate comes fully up to all requirements.

GOLD SOLDER To insure perfect results in plate and bridge work it is essential that the solder be of the same color as the plate. You take no chances when you use our plate and solder. Our solder does not "ball," and being chemically pure does not oxidize in the mouth. Write for samples.

FILLING GOLD Our foil and cylinders are chemically pure and do not contain carbon and impurities that are at times found in others. They are easily manipulated and our many satisfied patrons say it's hard to break the "Goldsmith habit" when once acquired. Goldsmith foil and cylinders are the lowest in price of any, and the cheapest at any price. Write for samples.

☞SEE OUR PRICE LIST ON PAGE 45.

GOLDSMITH BROS.,

Refiners and Manufacturers of Dental Specialties.

63 Washington St., CHICAGO, ILL.

NEW YORK OFFICE: 29 West Forty-second Street.

GOLDSMITH BROS.

SMELTERS AND REFINERS

63 AND 65 WASHINGTON ST.

Chicago, April 24, 1903.

DEAR DOCTOR:--

Do you make or use Seamless Crowns? If so we are sure this will interest you. It is a well known fact that no cylinders or ferules can be drawn with uniform thickness by a hand draw-plate, as when driving the disk through, unless held perfectly true (which is almost impossible) the Gold varies in thickness, leaving one side so thin as to make it almost useless. Realizing this, we have gone to a great expense in having machinery made to draw these Cylinders in one operation, so that when tested with a micrometer the disks do not vary a particle.

Another very important point is the Gold used for this kind of work. The ordinary 22-karat gold as used for soldered crowns is not adaptable for seamless work, it being entirely too stiff, and when contoured to the shape required it often cracks, spoiling the work. Our special Gold is very soft and malleable, yet of the required strength to stand the strain, especially in bridgework.

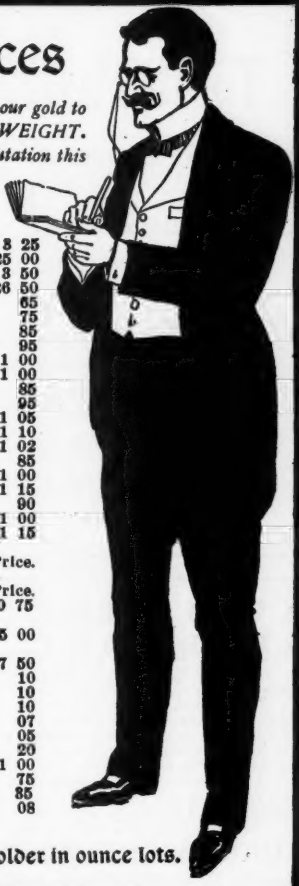
The price of these ferules is $1.05 per dwt. This is a great saving both in time and money, and you have no faulty disks and very little scrap gold. We shall be pleased to mail you free, upon application, one of our sets of fourteen 30-gauge fac-simile copper tubes for measurements.

Yours truly,

GOLDSMITH BROS.

Note Our Prices

and bear in mind that we absolutely guarantee our gold to be of the FINENESS specified and FULL WEIGHT. We mean to continue to uphold the good reputation this firm has enjoyed the past 35 years.



Price List.

Gold Foil, ½-oz.	$ 3 25
Gold Foil, per oz.	25 00
Gold Cylinders, ½-oz.	3 50
Gold Cylinders, per oz.	26 50
14K Solder, per dwt.	65
16K Solder, per dwt.	75
18K Solder, per dwt.	85
20K Solder, per dwt.	95
Coin Solder, per dwt.	1 00
22K Solder, per dwt.	1 00
18K Gold Plate, per dwt.	85
20K Gold Plate, per dwt.	95
22K Gold Plate, per dwt.	1 05
24K Gold Plate, per dwt.	1 10
Coin Plate, per dwt.	1 02
Clasp Metal, per dwt.	85
Clasp Wire, per dwt.	1 00
Platinized Gold, per dwt.	1 15
18K Gold Wire, per dwt.	90
20K Gold Wire, per dwt.	1 00
24K Gold Wire, per dwt.	1 15
Platinum Sheet or Wire, per dwt.	Market Price.
Platinum Iridio Wire, per dwt.	Market Price.
Pure Silver, per oz.	$ 0 75
Columbian Alloy, $2.00 per oz; 3 ozs. for	5 00
65 Silver, 35 Tin Formula, $1.00 per oz.; 10 ozs. for	7 50
Aluminum, per oz.	10
German Silver Plate, per oz.	10
Pure Zinc, per oz.	10
Pure Tin, per oz.	07
Pure Copper, per oz.	05
Pure Bismuth, per oz.	20
Broaches, per doz.	1 00
Burs, per doz.	75
Carborundum Strips, per box.	35
Carborundum Disks, per box.	08

5% Discount on 22K Gold Plate and Solder in ounce lots.

☞Send us your orders—We'll do the rest

Goldsmith Bros.,

Refiners and Assayers,

63-65 Washington St., Chicago.

New York Office: 29 W. 42d St.

THE QUALITY OF A

Tooth Paste and Tooth Powder

should appeal to every dentist as one of the most important adjuncts to oral hygiene.

Dr. Green's
Aseptolene Tooth Paste and Tooth Powder

are highly antiseptic dentifrices, alkaline and astringent, contain no grit, and impart to the mouth a sensation of freshness and cleanliness.

Cures Pyorrhea In Its Earlier Stages

Samples sent on application

This Company is composed of dentists, and is run on the co-operative plan.

Write for particulars. They will interest you.

DR. GREEN CHEMICAL CO., Manufacturing Chemists
IONIA, MICHIGAN

AVOID THE NEEDLE
AVOID ALL PAIN

A very simple proposition, Doctor, if you use **Eureka Obtundent** for all dental and minor surgical operations of mucous surfaces.

It is a perfect anæsthetic, which, when applied to the gums or mucous surface, instantly produces complete anæsthesia. It is absolutely harmless, contains no cocaine (we say this again—**it contains no cocaine**) and avoids all danger of poisoning, slight or severe.

Eureka Obtundent is the only local anæsthetic in the world that can be used without hypodermic syringe or needle. You will find it of wonderful service in your practice.

SEND US ONE DOLLAR

for a one-ounce bottle (enough for 100 teeth); try it, and if it is not satisfactory in every particular, we will refund your money without argument.

Address all orders or requests for literature to the manufacturers,

EUREKA CHEMICAL COMPANY, Omaha, Neb.

Fill one with plaster, press it on your cast until plaster is set, then take it off and you will behold a beautiful plaster air chamber deposited on your cast.

With It You Can Make Hundreds of Air Chambers for a Penny

Set of four different sizes at all Dental Dealers, 35 cents; or at

DR. L. ARNDT, - - - 305 Webster Ave., Jersey City Heights, N. J.

Higgins' Hexagon Needles

BEST ON EARTH

Price Per Dozen, $1.25 **Wrench Given Free**

In order to introduce our

GERMAN MADE BURS

We make a special offer for a short time only

Regular retail price $1.00
Our Special Price 70 Cents

TRY THEM

If you have not tried

PLASTIC IMPRESSION RUBBER

you should do so at once, for it has proven by its enormous sale to be all we claim, "The best that has ever been placed before the dental profession," for refitting plates that have become loose due to absorption or are a misfit from any cause.

Price per package $1.00. Package contains enough for from five to eight plates.

THE

Higgins Dental Mfg. Co.

BELLEVUE, OHIO.

THE Place Seamless Crown System

The only swage that will **constrict** the gold cap to any model perfectly, no matter how bell-shaped the tooth.

The root measure of a broken down tooth is obtained by fitting accurately a copper band so there is no guess work.

The model determines every outline of the crown so that accurate occlusion, contour and neck measure is assured.

System complete.....$15.00 or
Swage separate..... 5.00
Low fusible metal, 4 oz ... 50c.

J. W. PLACE, Mfr., Tuckahoe, N.Y.

ODONTUNDER

OVER TEN YEARS' STANDING WITHOUT A SINGLE FATALITY.

Write for our Special Terms.

Odontunder is Guaranteed to Give Perfect Satisfaction.

RECENT TESTIMONIALS.

RICHFIELD SPRINGS, N. Y., AUG. 10, 1899.
Odontunder Mfg. Co , Fredonia, N. Y.:
Dear Sirs—Please send me by return U. S. Express $10 00 worth of Odontunder. I enclose check for same. It is working fine.
Very respectfully,
S. J. DOWNS.

IDAHO SPRINGS, COL., OCT. 21, 1899.
Odontunder Mfg. Co., Fredonia N. Y.:
Dear Sirs—Please ship me a $10.00 lot of Odontunder at once, C. O. D., and oblige,
Yours very truly, A. E. BARKER.
P. S.: I find that no other local anesthetic can do the work so well as Odontunder.

Odontunder will not deteriorate. Every bottle guaranteed. Cash to accompany order of goods sent C.O.D.

References: Commercial Reports, Fredonia National Bank.

So generally is Odontunder used that we guarantee to send you the name of some friend or classmate who is using it, with whom you can correspond.

Single Bottles, 2 oz., $2.00 by Express.
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Beware of any one else offering Odontunder for sale or claiming to have bought the formula. Odontunder is sold only from the house direct.

ODONTUNDER MANUFACTURING CO., Fredonia, N. Y.

Dr. Scheuer's
TIN CEMENT

REGULAR SIZE

ACTUAL SIZE OF BOTTLES

This cement gives a beautiful and durable filling, with silverlike shining surface which does not discolor the dentin.

PRICES: Per Box, $1.50; Per Six Boxes, $7.50; Powder or Liquid, 75c

Sole Importer for U. S. and Canada

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FOR SALE AT ALL LEADING DENTAL DEPOTS. WRITE FOR OUR PAMPHLET.

Dr. Scheuer's Sponge-Tin

(CRYSTALLOID TIN)

Spongy, Soft and Fibrous

This Crystalloid Tin does not have the form of bright crystals or a fibrous mat, like crystal gold, but assumes the form of lumps or powder. It has a dull gray color, and does not become bright until packed and burnished.

DIRECTIONS

Take a piece or lump of Sponge-Tin the size of your cavity and condense the same in the cavity with a fine serrated large size gold packer (Royce or Solila Plugger points); add more to it, and fill almost to the margin of the cavity, using steady, firm hand pressure. Upon this condensed mass pack a layer of UNANNEALED GOLD (S. S. White's Moss Fibre Gold, Watts' Crystal Gold, Steurer's Plastic Gold or Nelm's Sponge-Gold), then a layer of the same mentioned golds but ANNEALED, and finish with ANNEALED GOLD cylinders.

The powder or small particles may be used and condensed the same as the rest.

This preparation is chemically pure, absolutely free from acids and does not deteriorate.

PRICE, Per Box, - - $1.50

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is an antiseptic combination of such drugs as: Formalin, Kreasote, Thymol, Alum and Zinc.

LYSOFORM
Is a trade name for a compound of: Formalin, Kreasote, Thymol, Alum and Zinc.
For abscessed Teeth, putrescent root canals, and as a permanent root filling has no equal.
Price per Box $1.50
Separate Liquid or Powder 75c. each.
SOLE AGENT,
GUSTAV SCHARMANN,
1181-1183 BROADWAY,
NEW YORK, N. Y.

For putrescent canals, excavate pulp chamber and apply liquid once or twice under seal. Then clean out canals and fill with powder and liquid by pumping in with broach and follow by rubber point.

If Sod. Dioxide method is used or Sodium and Potassium fill at the same sitting.

For abscesses, evacuate pus, mechanically apply a drop of Eucalyptol to a drop of the liquid on a pledget of cotton and after two or three treatments a permanent cure will be effected. Fill roots same as above.

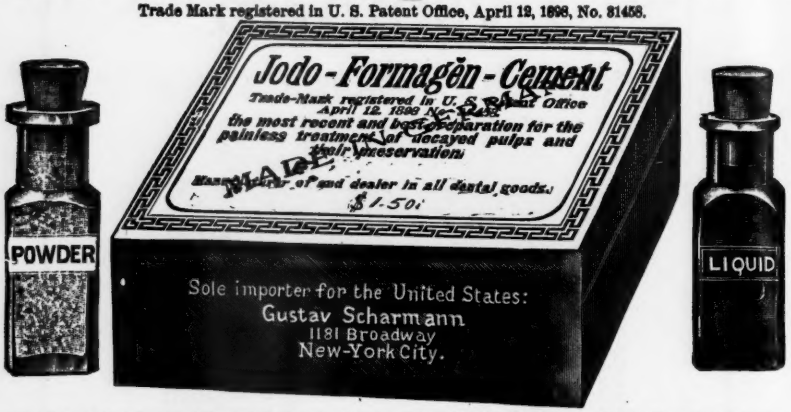
Always use rubber dam and exclude saliva.

PRICE, Per Box, $1.50

Separate liquid or powder, 75c. each

Jodo=Formagen Cement.

Trade Mark registered in U. S. Patent Office, April 12, 1898, No. 31458.


POWDER
Jodo-Formagen-Cement
Trade-Mark registered in U. S. Patent Office
April 12, 1898 No. 31458.
the most recent and best preparation for the painless treatment of decayed pulps and their preservation.
Manufactured and for sale by dealers in all dental goods.
$1.50
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LIQUID

In acute and chronic pulpitis this preparation is astoundingly efficacious. It is in its essential parts a combination of Jodine salts and Formaldehyde on the one part, and Eugenol, Carbolic, Lysol on the other, in form of a quickly hardening cement.

NO MORE ARSENIC. NO MORE EXTRACTION

PRICES: Regular Package, ... $1.50
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Some of the Advantages

A HARD RUBBER HANDLE
EQUIPPED WITH COARSE COGWHEELS
A SMALLER HEAD
HEAVIER BURTUBE
STRONGER MADE THROUGHOUT

Price, $4.00

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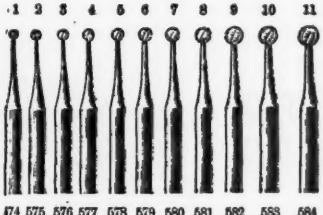
When purchasing your IMPORTED CROSS-CUT AND ENAMEL FISSURE BURS be sure you get the right ones stamped with our registered trade-mark. ←DAZ

Our burs are the original imported burs, and being sold in the U. S. for the last 15 years have gained a good reputation with the conscientious operator, owing to their superiority in cutting qualities over all other imported burs. Send your orders directly to the Importer,

Gustav Scharmann, 1181 Broadway, New York City,
or to the Dental Protective Supply Co., Chicago and Philadelphia.

CROSS-CUT ENAMEL BURS.—ROUND



Per doz., ½ gross — $ 2.00, 10.00 — $3.00

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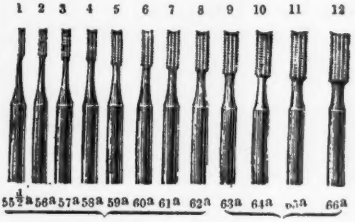

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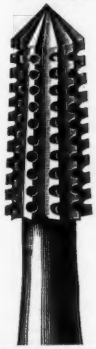

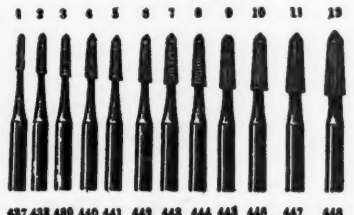

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has won its popularity with dentists on its own honest merits, and there is no questionable manipulation of stocks in connection with it.

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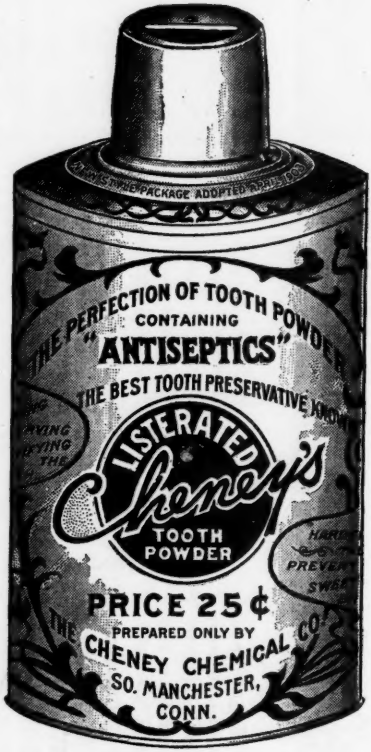

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The Suprarenal Capsule Local Anesthetic. After seven years is still leading for QUALITY, RELIABILITY and PRICE.

Fine All Metal Syringe Free

This is a large (30 minim) syringe, tested to 600 lbs. pressure. No breakage, waste of time, money or anesthetic.

Price, 10 ounces Sup-re-nol and Syringe, $5.00

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This Tube Actually Sprays the Liquid

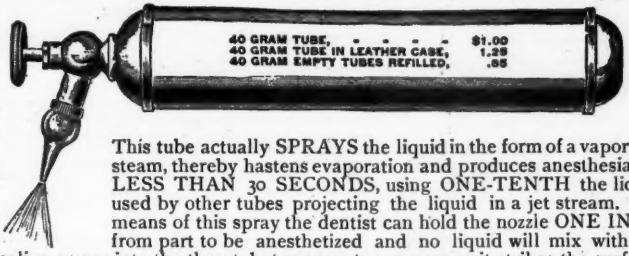
GEBAUER'S

40 Gram Tubes Refilled for 85 cents

ETHYL CHLORID C. P.

Ever Ready LOCAL ANESTHETIC Perfectly Harmless

This liquid has a boiling point of 12.5 C. and is guaranteed to be absolutely pure



This tube actually SPRAYS the liquid in the form of a vaporized steam, thereby hastens evaporation and produces anesthesia IN LESS THAN 30 SECONDS, using ONE-TENTH the liquid used by other tubes projecting the liquid in a jet stream. By means of this spray the dentist can hold the nozzle ONE INCH from part to be anesthetized and no liquid will mix with the saliva or run into the throat, but evaporates as soon as it strikes the surface.

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Hall's Carborundum Rubber Disks

USE • WET OR DRY

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For all purposes from finishing Fillings to shaping Crowns and Inlays.

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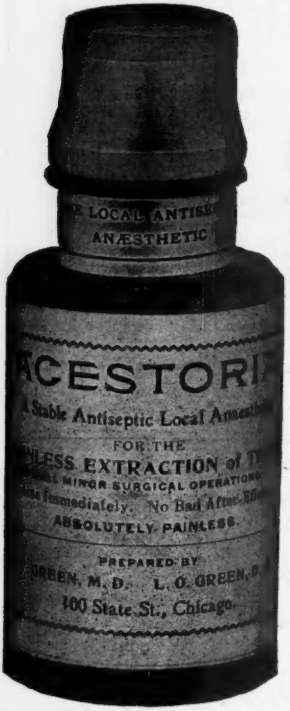
Local Anesthetic for Extraction of Teeth and Minor Surgical Operations



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Sufficient cocain mur. is added to make a one per cent solution, which, in the presence of nitroglycerin, can not produce any depressing or bad effect.

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We desire to call your attention to the **antiseptic** qualities of the local anesthetic, **ACESTORIA.**

A glance at the formula will satisfy you as regards antiseptic properties. To test its anesthetic action we desire to have you use a sufficient quantity to prove, positively, its value and our claim of having produced the ideal **local antiseptic anesthetic.**

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We devote our entire attention to the manufacture of **Gold Fillings.** We make nothing else.

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The illustration shows the attachment inposition with the tube set in a gold crown and artificial teeth in position ready for the packing of vulcanite according to the ordinary procedure. In packing the rubber the anchor attachment will be embedded and then vulcanized in position, thus making it a fixed part of the denture. Particular attention is drawn to the perfect adaptation of attachment to denture and that the former in no way interferes with adjacent teeth.

The entire process of adjusting and setting the Roach attachments is done without the use of special tools, no jigs being required for the paralleling of parts, which when compared with other systems for the same purpose is an advantage which every practitioner must appreciate.

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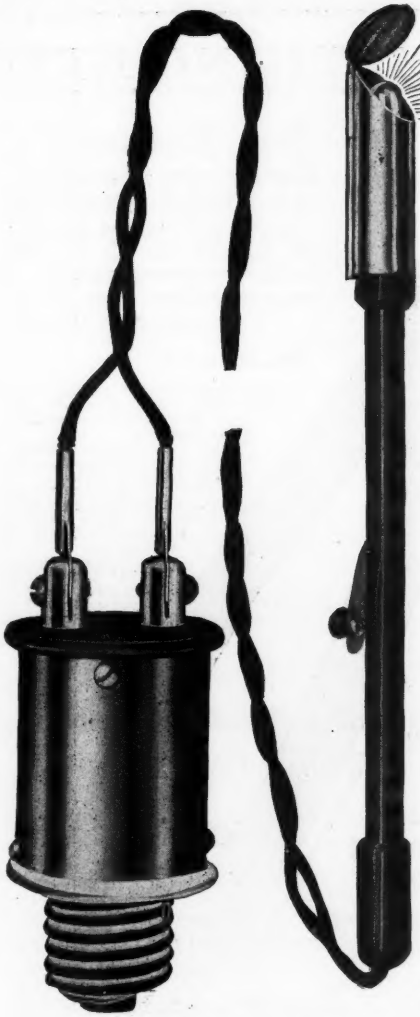

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The D. P. S. Co.'s Electric Mouth Lamp

is simple in construction, neat and compact in design, and withal answers every purpose for which it is intended.

The plug, which admits of using the lamp on any electric-light fixture, also embodies the resistance. The lamp holder is of hard rubber and has midway of its length a small finger contact by which current is thrown on or off. The incandescent lamp, which can be readily replaced when burned out, is enclosed by a metal shield to which is attached an adjustable mirror. All metal parts are nickel-plated and the outfit is supplied with 5 feet silk conducting cord and for attachment to either Edison, Thompson-Houston or Westinghouse sockets. Can be furnished for either 104-volt alternating or 110-volt direct currents.

When ordering please give full particulars as to style socket, also voltage, etc.

PRICE, COMPLETE, $5.00

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Curviform, Converse, ANGULAR BEAKED
FORCEPS

The Scientific Forceps of the day. Why?

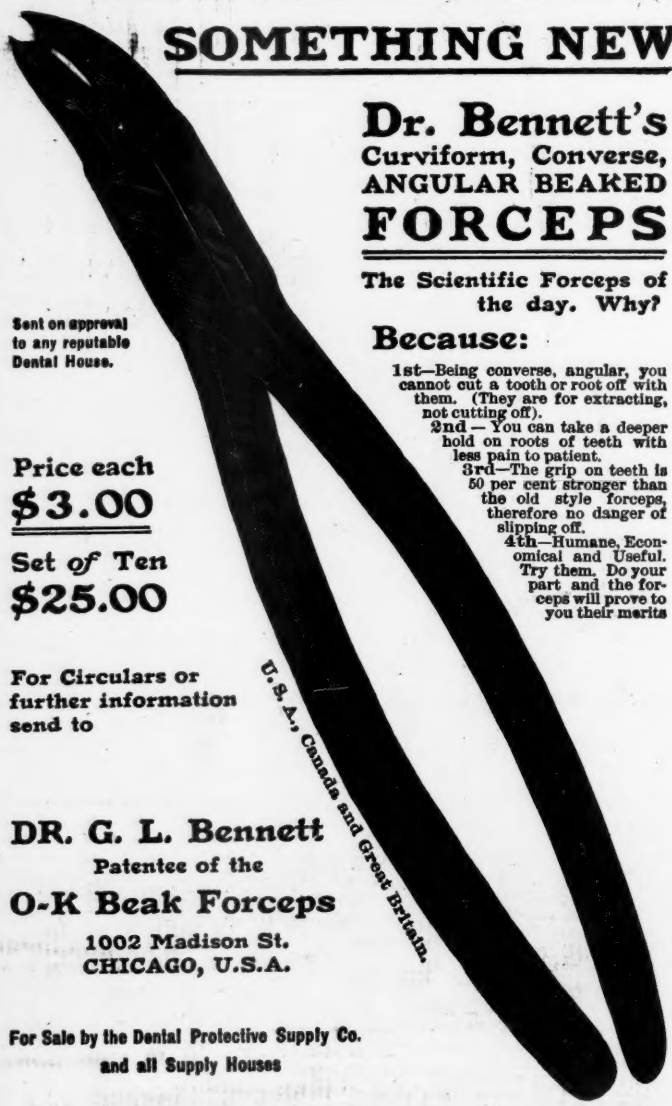
Because:

1st—Being converse, angular, you cannot cut a tooth or root off with them. (They are for extracting, not cutting off).

2nd—You can take a deeper hold on roots of teeth with less pain to patient.

3rd—The grip on teeth is 50 per cent stronger than the old style forceps, therefore no danger of slipping off.

4th—Humane, Economical and Useful. Try them. Do your part and the forceps will prove to you their merits



Sent on approval to any reputable Dental House.

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Set of Ten
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For Sale by the Dental Protective Supply Co. and all Supply Houses

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When it is necessary to use strength with it in applying a ligature it doesn't *break* and when you tie a knot it doesn't *slip*. That is the kind that Johnson & Johnson make and sell under their label bearing the Red Cross Trade Mark. The prices you may note and think over.

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A select grade in metal boxes with cutting device

12 yd. waxed.....per doz. $1.20
24 " " ..... " " 1.85
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Note the price of Brunswick Floss 24-yd. spools. *The best floss made* put up in the *best form.* One dozen 24-yd. spools for $1.85. Try one spool or a dozen spools and you will be convinced.

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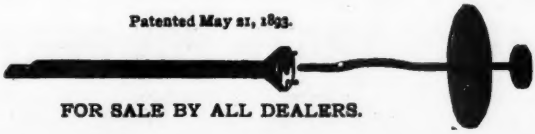

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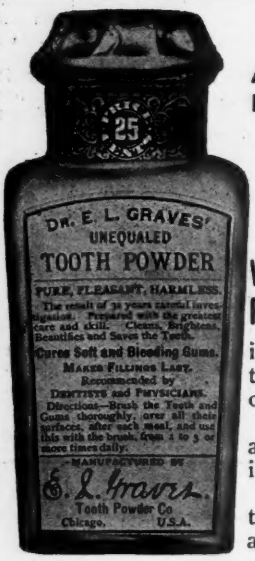

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A mild tonic and stimulant; an antacid, antiseptic, deodorizer and disinfectant. A perfect mouth wash.

Will you let us send you package to-day? Write us at once for literature and samples.

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contains no Acid, Soap, Potash, Charcoal, Cuttle-bone, Pumice-stone or other harsh and injurious ingredients so universally used in dental preparations, which scratch, wear, deface, and discolor the teeth, irritate and disease the gums.

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Metal Bottle, handy for Tourists.

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The Pink of Perfection

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2	Medium Orange	2.25
3	Dark Orange	2.75
4	Mottled (Light Red)	2.75
5	Mottled (Dark Red)	2.75
6	Maroon	2.75
7	Nubian or Jet Black	3.00
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9	Light Pink	5.00
10	Medium Pink	5.00
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13	15 minutes for repairing	2.25
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16	Gutta Percha Vulcanizable	3.00
17	Gutta Percha for Filling (per oz.)	1.50
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19	Black Weighted	4.00
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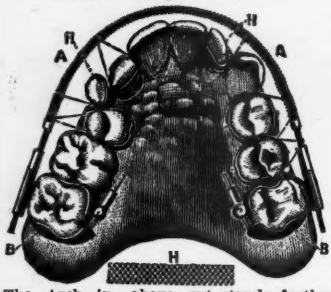

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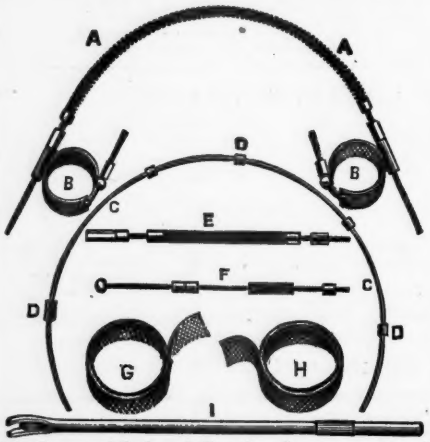

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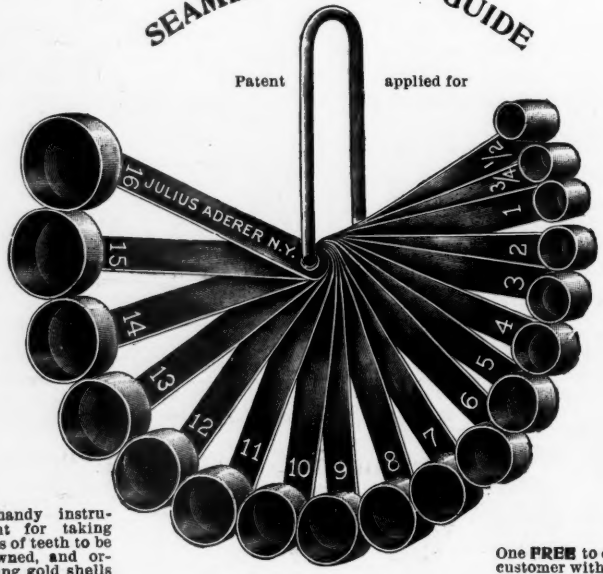

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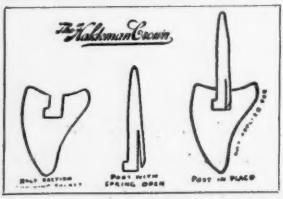

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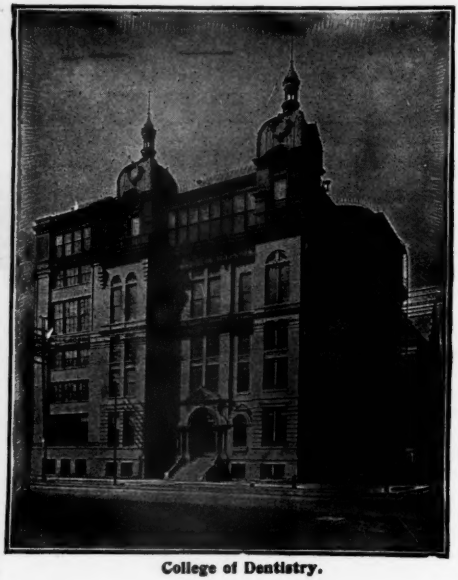

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